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Worker Separation under Performance Pay: Empirical evidence from Finland [+]

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Abstract: This paper investigates the role of individual incentive (II) and group incentive (GI) pay as determinants of worker separation. We use a large linked employer-employee panel data set for full-time male manufacturing workers during 1997-2006 from Finland. We follow actual job spells and switches of individual employees and define separation as worker exit from his current employer. The key finding for white-collar workers is that group incentive pay is associated significantly with increased probability of separation and hence diminished employment stability, but in large firms only. For blue-collar workers our results consistently indicate that individual incentive pay is associated with a decreased probability of separation and hence enhanced employment stability, both in small and large firms. Our finding that group incentive pay increases the risk of separation for white-collar workers is more consistent with theoretical work such as Lazear (2000) and Fehr and Gaechter (2000), while uncovering that individual incentive pay decreases employment stability for blue-collar workers supports theoretical work such as Parent (1999) and Paarsch and Shearer (2000).

JEL Codes: J33; M52; J31; J62; J63
Keywords: performance pay; worker separation; job mobility; earnings inequality

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1. Introduction

Much evidence shows that employee turnover rates can be excessive in many labor markets (e.g. Davis and Haltiwanger 1999). Firms may dislike undue turnover of workers because it is associated with search and selection costs. These costs can be particularly large when labor markets are tight and firms cannot find suitable workers to replace those exiting, implying costly productivity losses. Many workers too may have an aversion to high turbulence in labor markets. For example, job security is a key factor affecting job satisfaction (e.g. Origo and Pagani 2009) and satisfied workers tend to have a longer duration of employment (e.g. Freeman 1978; Lévy-Garboua et al. 2007; Böckerman and Ilmakunnas 2009). More stable employment relationships also provide stronger incentives for incumbent employees as well as firms to invest in firm-specific human capital.

Recently, the rapid diffusion of performance pay including both individual incentive pay (linking pay to individual performance) and group incentive pay (tying pay to group performance) has been a phenomenon underway in many economies. Bryson et al. (2012) estimate that the coverage of incentive pay ranges from 10-15% in some European countries to around 30% in Sweden and Finland, and over 40% in the US.[1] In tandem with the increasing use of performance pay, a rich literature has emerged. The theoretical literature, however, has ambiguous findings that sometimes vary with key worker characteristics --- contrast those studies that suggest that performance pay may boost workers' performance and ultimately decrease the probability of quits (e.g. Parent 1999; Paarsch and Shearer 2000) with those who predict that group (individual) performance pay may lead to high-ability (low-ability) workers exiting from the firm (e.g. Lazear 2000). In turn the scope of the available empirical work is limited as most performance pay studies focus on effects on firm and worker outcomes such as

[1] See Lemieux et al. (2009) for earlier evidence for the US.

productivity, wage inequality and earnings (e.g. Lemieux et al. 2009; Kruse et al. 2010). Importantly, much less is known about how performance pay is associated with worker separation.

This study aims to address competing hypotheses concerning the role of performance pay as a determinant of worker separation. Our large linked employer-employee panel data from Finland enables us to investigate the impact on separation of both individual incentive pay, where individual worker performance is used as a primary measure of performance, and group incentive pay, where group performance (such as team output and firm-level profit) is used as a primary measure of performance. This improves on much previous work that tends to focus on one type of performance pay, profit sharing, a group incentive pay scheme (e.g. Chelius and Smith 1990; Kraft 1991).

A second contribution flows from our using linked employer-employee data from member firms of the Confederation of the Finnish Industries (EK). In contrast to most previous studies that use survey data, which may be subject to various measurements errors (such as recall errors), our data are *individual worker-level* panel data. Also, these register-based data for manufacturing firms contain detailed data on the nature and *the structure of pay* (e.g. whether a worker is paid for performance in some form of non-fixed pay in a given year) and rich and reliable information on *worker characteristics* (e.g. educational level, age and occupation). Also, unique employer identifiers allow us to follow actual job spells and switches (instead of intentions to switch) of individual employees for a long time-period, namely from 1997 to 2006.

Our data also enable us to investigate the impact on separation of a wider range of covariates than has typically been used in previous work. Of special note are measures of within-firm earnings inequality. While rising earnings inequality is associated with the rise of political polarization and the increased economic divergence between blue-collar and white-collar workers in many developed economies (e.g. Piketty 2013), it is also related to worker separation through the workers' perceptions of fairness, reciprocity, and motivation (e.g. Fehr and Gaechter 2000), the fair wage hypothesis (e.g.

Cohn et al. 2015), and the promotion tournament theory (e.g. Lazear and Rosen 1981; Eriksson 1999). However, the sign of the relationship is theoretically ambiguous, while the available empirical work is quite limited. Our paper aims to provide some of the most detailed empirical evidence on the role of earnings inequality and other worker characteristics including occupation, education and undesirable work schedules as well as firm characteristics such as size as determinants of worker separation.

The literature tends to focus on "liberal market economies" such as the US and the UK, as compared to "coordinated market economies" such as Finland. Thus our final key contribution is to show that group and individual incentive pay also matters for worker separation in "coordinated market economies" (or a compressed wage environment).

The paper is organized as follows. In the next section we provide a conceptual framework and review related empirical work. Section 3 describes our data and represents summary statistics. In Section 4 we outline our empirical strategy. Section 5 reports our key findings. The final section provides conclusions and discusses implications.

2. Conceptual Framework and Prior Studies

When reviewing theoretical and empirical studies of worker separation under performance pay, the fundamental concern is the expected overall direction of the possible association between *performance pay and worker separation.* The literature falls into two camps. Many predict that performance pay leads to lower turnover. For example, Kruse (1992) argues that if profit sharing (group-incentive pay) leads to greater employee identification with the firm, employee turnover may fall reflecting improved goal alignment. Studies in the managerial and psychological literature have long cast a broader net suggesting that performance pay in general helps to retain employees through enhancing employee commitment (e.g. Florkowski 1987), job satisfaction (e.g. Long 1980), and worker motivation (e.g. Hammer et al. 1981). More recent economics literature, including behavioral and

experimental work (e.g. Eriksson and Villeval 2008), suggests similar outcomes, and often through similar mechanisms, with particular stress placed on how performance pay may facilitate improved goal alignment between workers and managers (e.g. Prendergast 1999). Finally, some argue that if performance pay increases wages (e.g. Parent 1999; Paarsch and Shearer 2000) this can be expected to enhance job satisfaction, which in turn decreases the probability of quits.

By contrast, a few theorists argue that effects will be in the opposite direction. By raising work-related stress (e.g. Smith 1776; Pouliakas and Theodossiou 2009), performance pay may increase the probability of separation. In addition, performance pay (especially individual incentive pay) may increase wage inequality and heighten power asymmetry in industrial relations within the firm. This in turn may increase worker separation if tensions between managers and workers reduce workers' perceptions of fairness, reciprocity, motivation, and effort, especially through free riding (e.g. Fehr and Gaechter 2000). For Lazear, individual (group) performance pay may lead to low-ability (high-ability) workers exiting from the firm (e.g. Lazear 2000).

Existing empirical evidence on the direction of the overall link between performance pay and worker separation is relatively sparse and often has important shortcomings. Most previous studies focus on profit sharing, and rely mainly on survey data. The evidence from these studies is somewhat mixed. D'Art and Turner (2004) study firms in 11 European countries and do not find any employment-stabilizing effect of profit sharing. Using US data, Chelius and Smith (1990) find evidence of a profit sharing-turnover link which they describe is suggestive rather than definitive. In contrast, Kraft (1991) reports that profit sharing decreases the number of dismissals made by firms in the metal-working industry in the former West Germany. Kruse (1991) shows that employment decreases in economic downturn are smaller with profit sharing in publicly listed US manufacturing firms during the years 1971-1985. More recently, survey-based studies that focus on the link between profit sharing, separation and training, report a significant negative association between profit sharing

and separation (Azfar and Danninger 2001; Green and Heywood 2011). Also, many previous studies investigate a specific group of workers; for example, Azfar and Danninger (2001) use NLSY data on young white men in nonunion jobs between 1988 and 1994.

A second concern with many existing studies is the role of prominent covariates. First, some studies spotlight intra-firm wage inequality in influencing separation. While rising wage inequality might increase political, social and economic tensions at economy level (e.g. Piketty, 2013), it may also be associated with worker separation at the firm level. However, the sign of the relationship at the firm level is theoretically ambiguous. Some theorists stress that increased wage inequality may heighten power asymmetry within the firm and produce heightened tensions between managers and workers. This reduces workers' perceptions of fairness, reciprocity, motivation, and effort, especially through free riding, (e.g. Fehr and Gaechter 2000) and lead to more separations. Also there have been few studies that have tested implications of key propositions in the behavioral economics literature such as on the fair wage hypothesis; see, e.g., Cohn et al. (2015) who argue that sizeable wage inequality can be a source of worker job dissatisfaction and hence may result in greater worker separation. On the other hand, from the point of view of the promotion tournament theory (e.g. Lazear and Rosen 1981; Eriksson 1999), bigger wage differences within firms may motivate workers to compete for this prize and stay with the firm. This is likely to be more relevant to white-collar workers than to blue-collar workers because the promotion ladder tends to be longer for white-collar workers, including even top executive positions. In contrast, due to the more homogeneous nature of blue-collar jobs and the weaker promotion tournament incentive for blue-collar workers, blue-collar workers may dislike large wage dispersion within the firm.

Second, both theoretical and empirical evidence finds that adverse workplace conditions increase a workers' probability of quitting (e.g. Viscusi 1979; Gronberg and Reed 1994; Cottini et al. 2011). Similarly, dissatisfied workers are more likely to quit (e.g. Freeman 1978; Lévy-Garboua et al.

2007; Böckerman and Ilmakunnas 2009). While the empirical literature concerning the role of working conditions is large and impressive, much less is known how undesirable work schedules (or more broadly compensating differentials) are associated with a risk of separation, in particular after controlling for heterogeneity across workers, occupations and industries.

Also both theoretical and empirical literature suggest a role for factors beyond the firm on worker separation. Regional differences are likely to have a bearing on separation because social and economic structures of regions where firms operate differ. Also economic theory suggests an inverse relationship between (voluntary) worker outflows and unemployment. In the main empirical work provides support for the role of these covariates; for example, regional unemployment conditions have been found to be an important factor in explaining job mobility (e.g. Booth et al. 1999).

In sum, when studying the association between worker separation and performance pay, the theoretical literature is ambiguous while the growing empirical literature has important shortcomings. For example, the theoretical literature points to the importance of recognizing heterogeneity of workers in terms of occupation (white-collar vs. blue-collar in particular), education and age; at the same time, no empirical studies have yet been able to satisfactorily examine for these factors. As we will elaborate on in the following section, our data provide information that enable us to address some of these concerns and thus improve on previous research. In particular, by using information on whether each worker is white-collar or blue-collar, we undertake analyses for white-collar and blue-collar male workers separately.[2] In addition, our data enable us to take account of the heterogeneity of workers in their occupations by using occupational categories as controls, separately for white-collar and blue-collar workers. Similarly, we take into account heterogeneity of workers in their education (proxy for

[2] Due to some differences in the way the records are set up, our data are not fully comparable between white-collar and blue-collar workers. It is also likely that the determinants of the separation process differ between white-collar and blue-collar workers. We therefore analyze white-collar and blue-collar samples separately.

human capital) by including the formal level of education, highest level completed, as a control.[3] To control for regional differences, we use regional unemployment rates and region fixed-effects as controls. To investigate the role of firm size, we estimate our models separately for small firms (employment<100) and large firms (employment>100). Finally we are also able to control for undesirable working schedules as well as within firm earnings inequality. The former is measured by dummy variables for Sunday overtime work and Shift work; both equals one if a worker has received Sunday overtime and/or shift work payment in a given year and zero otherwise. In turn earnings inequality is measured by the standard deviation of employee earnings within the firm.

3. Data and Descriptive Statistics

Our individual-level panel data are obtained from the Confederation of Finnish Industries (EK) payroll records for its member firms.[4] The full data cover about 70 percent of all workers in manufacturing in Finland, and hence are representative of the population of Finnish workers in this sector. In terms of the overall Finish economy, the EK's data account for about a third of all private sector workers in Finland (Uusitalo and Vartiainen 2008). Most importantly, the data provide a unique source of information on *the type of compensation* (e.g. whether a worker in a given year has received some form of performance pay). In addition, the data provide information on *worker characteristics* (e.g. job tenure, education, age, and employer identifiers), *job characteristics* (e.g. occupation and job schedules) and *firm characteristics* (e.g. firm size and firm performance). We restrict our analysis to

[3] The data consists of six education categories (unknown, primary, upper secondary, lowest tertiary, bachelor, and master or higher). We combine two lowest-level education categories (i.e. unknown and primary) in our analysis. Information on the formal level of education in the EK data are originally from Statistics Finland.

[4] For member firms with fewer than 30 persons, providing payroll information to the EK is voluntary. To avoid potential sample selection bias this may induce, we exclude firms with fewer than 30 persons from our sample. Also we do not information on top management, workers who belong to the owners of the firm or are relatives to the owners as they are excluded from the records.

full-time[5] manufacturing workers from 1997 to 2006. To help to overcome problems introduced by high turnover of younger workers and early retirement schemes for older workers, we confine our analysis to workers who are aged 25-53 years old. Our analysis is also restricted to male workers since the proportion of female manufacturing workers in our sample that can be estimated is rather low--14% (22%) among white-collar (blue-collar) workers. Relatedly, female labor market decisions (e.g. job mobility) may be affected by the presence of young children and women who have just given birth may decide to interrupt their employment spell in order to stay at home with their children.[6] Perhaps more importantly, our data do not allow us to distinguish between "true" female exits from the ongoing job match and female exits from the ongoing job match due to family reasons such as decision to stay at home to take care of their young children. While typically the latter group of female workers remains on the firm payroll, this is not observable to us from the data because, while they are at the home, they are not paid by the firm and thus are excluded from the data. Also we cannot distinguish between two types of turnover, namely job-to-job versus job-to-non-employment and in understanding the turnover patterns of women, this feature has been shown to be quite important (Royalty l998).

Our measure of worker separation is objective and hence much less subject to measurement error than studies using subjective measures of separations. Specifically, whereas previous studies typically identify worker exit events using measures that are derived from survey information on worker *intentions* to move (e.g. Weisberg and Kirschenbaum 1991; Sousa-Poza and Henneberg 2004), we measure separations using *actual* changes in employer-worker matches, based on the employer firm ID code changes, from one year to the next. In so doing we are aware that a worker's firm ID code can change for reasons other than worker separations. For example, mergers and acquisitions of firms often result in firm ID changes for those workers affected, in spite of the fact that they are still working in the

[5] We use 30 hours per week as a cut-off definition for full-time blue-collar male workers.

[6] For example, Erosa et al. (2002) find that fertility decisions produce important gender differences in employee turnover rates.

same workplace under the same employment contract. To respond to this potential problem, we verify whether all workers exit from a firm in a given year (i.e. the firm ID changes for all the workers of the firm). If so, we exclude these worker-year observations from the sample (but keep all the preceding years of observations). In contrast to studies that assess inter-firm (or inter-industry) variations in separation rates using cross-sectional data, we follow actual job spells and switches of employees for a long time-period, specifically from 1997 to 2006. We also require that each firm exists at least three consecutive years in the data. As such our data have a number of advantages over those used in prior studies.

We recognize some limitations of our measure of worker separation. First, our data do not allow us to distinguish firm-initiated involuntary layoffs from worker-initiated voluntary quits, but this is also a shortcoming of some previous studies (e.g. Böckerman and Ilmakunnas 2009). We try to minimize the problem of voluntary vs. involuntary separations by focusing on full-time employees because, in Finland, these workers enjoy strong employment protection. And in the absence of severe economic downturns during the study period, we are reasonably confident that the bulk of separations are voluntary. In any event, on theoretical grounds, the distinction between layoffs and quits is also ambiguous because employers can always try to hound their workers out of a job (e.g. by reducing worker wages, reallocating work-tasks, or providing generous severance payment for volunteer movers).[7] Another shortcoming is that we do not have information on the characteristics of workers' families such as partners' age, earnings and the number of children. Further, worker separation events in the sample may consist of job-to-job transitions within the data (to another EK firm) as well as out-of-job transitions (to outside of the data), but we do not make a distinction between these two exit

[7] As discussed later, note that we control for regional economic conditions by regional unemployment rates and heterogeneity across firms by firm fixed effects. We also exclude worker separations due to plant closures from the sample. Further, we try to address this in our unreported regressions (see pp. 20 and 22) where we consider individual firm performance (proxied by growth of total earnings paid by the firm) as an additional covariate and our results were largely unaffected.

channels in our models. On reason for this is that, in the latter case, a worker can move either to unemployment, or out of labor force or to employment in other non-EK firms (e.g., small firms or other sectors), but our data do not allow us to distinguish between these three different forms of transitions.

However, the most important and novel aspect of this study is our ability to analyze whether two specific forms of performance pay, namely group incentive (GI) pay and individual incentive (II) pay, after controlling a rich set of important covariates, have different implicatios for worker separation. The classifications of the specific pay schemes we investigate are based on our conversations with EK's experts, our reading of EK's performance pay publications as well as our prior knowledge gleaned from studies of performance pay in Finnish companies (e.g. Jones et al. 2006; Kalmi and Sweins, 2010; Jones et al. 2010a; Jones et al. 2010b; Jones et al. 2012; Jones et al. 2017). These GI and II pay schemes can be described in more detail as follows. *Profit Sharing* in Finland is similar to profit sharing in other countries such as the U.S. and Japan (see, for example, Kruse (1992) for the U.S. and Kato and Morishima (2003) for Japan). It is a group incentive pay scheme linking individual worker's pay to firm-level performance, typically profit. As in the case of U.S. profit sharing, profit sharing in Finland can be either a cash plan (paid in cash to individual workers) or a deferred plan (contributed to the personnel fund). In our data we only have information on the former. This scheme is clearly group incentive pay scheme.

Gainsharing in Finland is typically not negotiated in collective agreements and is set by management. In other words, firms can unilaterally decide the adoption of gainsharing, without union involvement. Perhaps the most common example is an annually-paid cash bonus scheme. Its amount is often determined by how well performance targets are reached or surpassed. The targets are typically set at the group or unit-level. Amongst upper-white collar workers, in some cases, the group-level performance measures may have been complemented with the individual-level performance measures (e.g. how well an individual project has succeeded). However, our understanding is that gainsharing

schemes with *only* the individual-level performance measures were highly atypical, if any, in the sample period. Compared to profit sharing performance can be measured at a more local level, as in the case of most gainsharing plans in the U.S. and other advanced market economies. Gainsharing is largely a group incentive pay scheme.

Piece Rates is traditionally a payment scheme used when an individual worker's output can be measured rather easily and accurately. Usually a worker's pay is proportional to the quantity of output he produces. Not too surprisingly, piece rates are only used among blue-collar workers in our data. It is mostly an individual incentive pay scheme although in Finland it is possible that in some cases piece rates include a scheme making a minor part of worker's pay proportional to the quantity of output produced by her and her colleagues in the same work unit such as team. This scheme is largely an individual incentive scheme.

Finally, *Reward Pay* is similar to piece rates. It is mostly based (partly or fully) on individual performance rather than individual workload. Examples of performance measures include quantity of work (quantity reward), quality of work (quality reward) or some other performance measure at the individual level. As such, it is typically an individual incentive pay scheme. Sales commissions and production bonuses are examples of reward pay. Reward pay is common in paper and technology industries. As shown below, reward pay is much more common amongst blue-collar workers. This scheme is mostly an individual incentive scheme.

Our individual-level data on worker and job characteristics provide information on several covariates including shift work and Sunday overtime which traditionally have been viewed as important dimensions of undesirable work schedules or job scheduling arrangements. Rather unusually in the literature on separation, we also are able to include the standard deviation of worker annual earnings within-firm as a control for intra-firm wage dispersion, a potential source of job

dissatisfaction, calculated separately for white-collar and blue-collar worker groups within the firm.[8] To deal with unobserved heterogeneity across firms, we include firm fixed effects as controls. Also we use a broad set of industry and occupational dummy variables to account for differences in adverse workplace conditions[9] across industries and occupations. While these may not fully capture adverse conditions, this may not be an issue here due to the availability of a strong voice option through a high-level of unionization over a long period in Finland. Finnish workers under adverse workplace conditions are more likely to choose the voice option first rather than the exit option. Hence we expect worker separations in Finland to be less sensitive to adverse workplace conditions and worker discontent than in countries with low-level of unionization (for the exit-voice theory of trade unions, see Freeman (1980) and Freeman and Medoff (1984)). We also note that related empirical work has tended to focus on countries in which unionization rates are far from "high" (such as the US or the UK). By contrast, since the late 1960s in Finland unionization rates have been around 70-80% and collective agreements between employers and employees representatives have covered about 90% of the workforce. Moreover, collective bargaining and centralized income agreements are usually also binding for nonunion workers. These features of the Finnish labor market (especially when compared with the US and the UK) provide an interesting environment to assess worker separation.

To account for the impact of differences in the local labor market conditions on quit behavior, we use annual regional unemployment rates (obtained from Statistics Finland). To control for time-invariant differences across Finnish regions (i.e. Southern, Western, Eastern, Lower North, and Upper North provinces), we also include regional fixed effects as controls.

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[8] We do not include individual earnings in the basic separation model, since it is potentially an endogenous explanatory variable with individual earnings probably correlated with individual innate ability (in the error term) as well as worker separation (dependent variable). However, in unreported regressions, we do estimate specifications in which we also include individual earnings as an explanatory variable. The reported key findings are largely intact.

[9] In Finland working conditions are largely regulated by collective agreements between employee and employers representatives along industrial lines. For white-collar workers we use 24 and for blue-collar workers 30 manufacturing industry dummies.

Table 1 reports summary statistics for key variables for white-collar workers.[10] The unconditional separation rate (sample mean) is 0.12. The average size of (realized) group incentive pay is about 5% of worker annual total earnings, or about 2,250 euros. In turn the incidence of group incentive pay is 0.57. Concerning undesirable work schedules, the incidence of Sunday overtime work is more common than shift work.

Table 2 reports summary statistics for blue-collar workers.[11] The unconditional separation rate is 0.17, implying somewhat larger separation risk than for white-collar workers.[12] The average size of group incentive pay is close 4% of worker annual total earnings, or about 1,000 euros. More importantly, the average size of individual incentive pay is 16.6% of worker total annual earnings, or about 4,700 euros. The incidence of group incentive pay is 0.17, while the incidence of individual incentive pay is 0.39.[13] With an incidence rate about 0.85, undesirable work schedules are common among blue-collar workers. Comparing entries in Table 2 and Table 1 also reveals that blue-collar workers in the sample are less educated than white collar workers.

[10] The overall population of white-collar male workers in the EK data consists of 1,187,583 worker-year observations, or 218,630 workers. A small number of workers with multiple job spells within a year were excluded. As is the usual practice, observations with missing data were dropped from the analysis. Our sample for white-collar workers (e.g. full-time workers, aged 25-53 years old, firms with fewer than 30 persons excluded etc.) we use in estimations consists of 229,117 worker-year observations, or 58,749 workers in estimations.

[11] The overall population of blue-collar male workers consists of 2,070,940 worker-year observations, or 389,227 workers. After data cleaning and construction of our sample (e.g. full-time male workers, aged 25-53 years old, firms fewer than 30 persons excluded etc.), we use in estimations 340,344 worker-year observations, or 80,338 workers.

[12] Reassuringly these numbers are in line with previous findings for Finland – for example, Theodossiou and Zangelidis (2009) found about a 14% probability for men of moving either to another job or non-employment.

[13] Somewhat surprisingly, in our sample 26% of blue-collar workers may have received both group and individual incentive pay in a given year. For empirical analysis, this combined performance pay variable is a potential concern since it may be highly correlated with both individual and group incentive pay, making the estimates less precise. Also, the association of this combined variable with worker separation is an aggregate of individual and group incentive effects, which would make its interpretation difficult. We therefore do not include this combined performance pay variable in our models. We did, however, some additional robustness checks to respond to this issue (see p. 22).

4. Empirical strategy

To motivate our empirical analysis, we follow Frederiksen (2009). In a standard model of job separations and labor market flows the value of an employment match is a function of an individual's characteristics (e.g. age, education), job factors (e.g. undesirable work schedules, occupation, performance pay) and firm characteristics (e.g. employer size, earnings inequality, firm performance, industry). The value of the current employment match (V_{it}^{C}) can be characterized as follows:

$$(1)\quad V_{it}^{C} = f^{C}\left(W_{it}, J_{it}^{C}, F_{it}^{C}, \varepsilon_{it}^{C}\right),$$

where W_{it} is the vector of individual worker characteristics, J_{it}^{C} is the vector of job factors, F_{it}^{C} is the vector of firm characteristics and ε_{it}^{C} is a random component (i.e. the value of the match is not known with certainty). Superscript *C* refers to the worker's current employer. Within the current job spell in *t*-1, in subsequent period *t* the worker has an option to continue with the current match or to separate. If we assume that the worker separates and starts work for an alternative employer (*A*)[14], the alternative employer may value worker characteristics (W_{it}) differently from the current employer (*C*). Likewise, job factors and firm characteristics are likely to differ between the current and the alternative employer (e.g., we might write $J_{it}^{A} = x' F_{it}^{C}$ and $F_{it}^{A} = z' F_{it}^{C}$). This implies that the value of the alternative match differs from the value of the current match ($V_{it}^{A} = f^{A}\left(W_{it}, J_{it}^{A}, F_{it}^{A}, \varepsilon_{it}^{A}\right) \neq V_{it}^{C}$). Since initially the worker has decided to work for the current employer, it must be the case that $V_{it}^{C} > V_{it}^{A}$. However, changes in the arguments of f^{C} in subsequent periods might make the alternative employment match economically more attractive for the worker. In this case, $V_{it}^{A} > V_{it}^{C}$ and the worker separates from his current employment match.

We apply the linear probability model (LPM) for the conditional probability that worker *i* separates from firm *j* in year *t*, given that worker employment match has lasted until the end of the

[14] More generally, *A* could be any outside option for the worker.

previous year *t-1*. Our main focus is on how the incidence of performance pay in year *t-1* is associated with the probability of worker separation in next year *t*. For blue-collar workers our measure of performance pay includes both individual incentive pay and group incentive pay, while for white-collar workers performance pay contains only group incentive pay. We restrict our empirical analysis to the first separation event to avoid complications of multiple separations of same worker in estimations. In short, we model a conditional probability for the termination of single job spell. Because worker observations within the same firm may be correlated, standard errors are clustered at the firm level.

For white-collar workers we estimate the following linear probability model for a conditional probability of worker separation:

$$(2) \qquad P(Y_{i,t}^{WC} = 1 \mid X_{t-1}^{WC}) = \beta_0^{WC} + \alpha_1 GI_{i,t-1}^{WC} + \beta_1 X_{i,t-1}^{WC} + \beta_2 FIRM\_FE_{j,t-1}^{WC} + \beta_3 YEAR\_FE_{t-1}^{WC} + \varepsilon_{i,t}^{WC}$$

In Eq. (2) the dependent variable, $Y_{i,t}^{WC}$, equals one if the white-collar male worker *i* separates from his current job match year *t*, 0 otherwise. Our key focus in Eq. (2) is on α_1, which measures the association between the incidence of group incentive pay year *t-1* and the separation event in next year *t*, conditional on a broad set of one-year lagged covariates year. Reflecting our earlier discussion, the vector $X_{i,t-1}^{WC}$ includes controls for *worker characteristics* (age categories, formal level of education, earnings quartile within the firm), *job characteristics* (dummies for job scheduling hazards, 3-digit occupational dummies, job tenure in year 1997), *firm characteristics* (industry, size (6 categories), earnings inequality (within firm standard deviation of worker earnings), and *regional characteristics* (regional dummies and annual regional unemployment rate (%)). Firm fixed effects ($FIRM\_FE_{j,t-1}^{WC}$) are included to capture time-invariant heterogeneity across firms (e.g. persistence in firm productivity and managerial practices). Year dummies ($YEAR\_FE_{t-1}^{WC}$) control for macroeconomic effects that are common to all white-collar workers.

For blue-collar workers we modify Eq. (1) to include the incidence of individual incentive pay ($II_{i,t-1}^{BC}$). Specifically, we estimate the following linear probability model for a conditional probability of blue-collar male worker separation in year *t*:

$$(3)\ P(Y_{i,t}^{BC}=1 \mid X_{t-1}^{BC}) = \beta_0^{BC} + \alpha_1 GI_{i,t-1}^{BC} + \alpha_2 II_{i,t-1}^{BC} + \beta_1 X_{i,t-1}^{BC} + \beta_2 FIRM\_FE_{j,t-1}^{BC} + \beta_3 YEAR\_FE_{t-1}^{BC} + \varepsilon_{i,t}^{BC}$$

In Eq. (3) we model our dependent variable, $Y_{i,t}^{BC}$, equals one if the worker separates in year *t* from his job match year *t*-1, 0 otherwise. Our interest lies in the parameters of $GI_{i,t-1}^{BC}$ and $II_{i,t-1}^{BC}$, i.e. α_1 and α_2. The vector of one-year lagged covariates included in Eq. (2) is as in Eq. (1). Because there can be important differences in worker separation across small and large firms, we also estimate Eq. (2) and Eq. (3) separately for small (employment <100) and large (employment>100) firms.[15]

5. Findings

Table 3 reports our key findings for white-collar worker separation under incentive pay, after controlling for heterogeneity across workers, jobs and firms. Our focus is on whether the incidence of group incentive pay (measured as % of the worker annual total earnings) in the previous year (*t*-1) is associated with worker separation in the subsequent year (*t*).

In column (1), for the full sample of firms, we find a positive and statistically significant association (10% level) between worker separation and group incentive pay. In terms of economic significance, a 10-percentage-point increase in the share of group incentive pay is associated with about a 2 percentage points (pp) *greater* risk of separation. As white-collar workers are typically more educated than blue-collar workers, we interpret this finding as being more consistent with theoretical work such as Lazear (2000) and Fehr and Gaechter (2000).

[15] This definition for small firms was used in prior studies such as Sauermann (2017).

Turning to other explanatory variables in column (1), we find that the estimated coefficient of earnings inequality is positive but insignificantly associated with worker separation. The odds of separation for workers in the fourth quartile of the earnings distribution are found to be not significantly different from workers in the third quartile. However, workers belonging to the first (second) quartile of the firm earnings distribution are 1.1 pp (0.5 pp) more likely to separate than workers in third quartile, both at the 1% significance. Given that quartiles of the firm earnings distribution also reflect differences in employee's marginal product of labor, this implies a greater risk of separation for lower productivity workers. Both measures of undesirable work conditions are negatively associated with worker separation. The estimates of Sunday overtime work and shift work are both negatively (-0.009) significant at the 5% level. We interpret this negative association as evidence of compensating differentials.

Compared with prime-aged workers 40-44 years old, workers in the 30-34 and 35-39 years old age-groups have a strongly statistically significant and positively association with separation. The parameter estimate for the former group implies about a 2.0 pp greater risk of separation, while for workers in the latter group the separation risk is about 1 pp. greater. While the separation risk for workers 45-49 years old is about 0.7 pp lower, the oldest group of workers 50-53 years old is consistently associated with about 19 pp greater risk of separation. One potential explanation for this finding could be age discrimination of older workers by employers. Alternatively, age 50-53 years might be a kind of boundary mark for workers to evaluate their work preferences and career prospects, and if unsatisfied with the current job match, are thus more likely to switch to another job match. Unfortunately, our data do not allow us to disentangle these two potential explanations.

The association between educational level and separation is positively significant for primary-level education as well as bachelor-level or above (compared with the reference group of tertiary-level educated workers). For example, workers with primary-level and masters-level education are

associated with an enhanced risk of separation (by about 2 pp). For highly-educated workers, this finding is consistent with skill-biased technological change (e.g. Autor et al. (1998)), if the enhanced risk of separation for them reflects an increased relative demand of high-educated (skilled) workers in the labor market due to a shift in the production technology that favors skilled workers. Similarly, if the increased separation risk of low-educated and high-educated white-collar workers reflects an increase in their relative demand in the labor market, this finding is in line with the idea of job polarization in occupations (e.g. Goos et al. (2009) argue that the share of employment in low-skill and high-skill occupations has increased in the US and Europe).

In columns (2)-(3) we split the white-collar sample by employer size (cut-off is 100 workers) and report findings for small and large firms separately. Concerning group incentive pay, we continue to find that group incentive pay (as % of the worker total annual earnings) is positively associated with worker separation, but only in large firms. The size of the parameter estimate is 0.002 and it is significant at 10% level. One potential explanation for this disparity in findings between small and large firms could be in the greater free-riding concerns of white-collar workers in large firms. Alternatively, it may simply reflect better outside job options for the most able white-collar workers, i.e. those who receive group incentive pay.

For other covariates the findings in columns (2) and (3) show some striking differences compared to the findings reported for the full sample of firms in column (1). First, we find a positive association (0.3) between earnings inequality and separation in small firms at the 1% level (column 2), but not in large firms in (column 3). The positive association with worker separation is consistent with those who argue (e.g. Cohn et al. 2015) that sizeable wage inequality can be a source of worker job dissatisfaction and hence may result in greater separations. Indeed our findings suggest that the inequality-dissatisfaction link has an even greater weight in small than in large firms. Column (2) also shows that, in small firms, workers in the fourth quartile of the earnings distribution face about a 1 pp

larger risk of separation (compared to the reference category, Q_3). In turn in large firms (column 3) workers in the first (1 pp) and second (0.05 pp) quartile of the earnings distribution face larger risk of separation (again compared to the reference category Q_3). Interestingly, Sunday overtime time work (undesirable work schedules) is associated with a reduced separation risk for small firms (column 2), but not for large firms (column 3). We do not discuss the findings for worker age and educational level (reported in columns (2) and (3)) in more detail because the results are qualitatively similar to those reported in column (1).

Finally, we undertake some robustness checks. In one set of exercises, we estimate columns (1)-(3) using individual worker total earnings instead of within-firm earnings quartiles. While overall the findings (not reported here but available upon request) are qualitatively intact, we find that the parameter estimates for group incentive schemes in columns (1)-(3) are consistently statistically more significant than those reported in Table 3. In a second set of exercises, in order to distinguish between voluntary and involuntary separation, we add a measure of firm performance (i.e. one-year lagged annual growth rate of total amount of earnings paid by firm). In these cases, the findings (not reported here but available upon request) remain qualitatively the same.

[TABLE 3 ABOUT HERE]

Table 4 reports findings for blue-collar workers. Contrast to white-collar workers, for blue-collar workers we observe both group incentive pay and individual incentive pay in our sample. In column (1), where we look at the full sample of firms, we find a negative association between separation and individual incentive pay (measured as % of the worker annual earnings). The estimated coefficient (-0.001) is statistically significant at the 1% level. This finding is in line with our prior expectations as individual incentive scheme is typically used when worker's output can be measured

rather easily and accurately. In terms of economic significance, a 10-percentage-point increase in individual incentive pay is associated with about 1 pp *decrease* in the risk of separation. A negative association between worker separation and individual incentive pay is also consistent with theories such as Parent (1999) and Paarsch and Shearer (2000). In turn we do not find a significant association between group incentive pay and worker separation.

In columns (2)-(3) we again split our blue-collar sample by employer size (cut-off is 100 workers) and report findings for small and large firm separately. Concerning group incentive pay in columns (2) and (3), we continue to find, both for small and for large firms, an insignificant association with worker separation. In a similar vein, in columns (2) and (3) we continue to find that individual incentive pay reduces significantly a risk of separation and thus enhances employment stability in small and large firms. The parameter estimate is -0.002 for small firms (col.(2)) and -0.001 for large firms (col.(3)). In terms of economic significance, a 10-percentage-point increase in the relative size of individual incentive pay is associated with a lower of separation (about 2 pp in small firms and about 1 pp in large firms).

For other covariates, in columns (1)-(3), earnings inequality is insignificantly associated with separation. Concerning earning quartiles, workers in the first and second quartiles are about 0.7 pp more likely to separate than workers in the reference category (Q_3); for small firms this effect seems to be somewhat more sizeable (about 1.3 pp in column (2)) than for large firms (around 0.6 pp in column (3)). On the other hand, workers in the highest earnings quartile (Q_4) are about -1.0 pp less likely to separate at 1% significance level (compared to ref. category Q_3). Undesirable work schedules are negatively significant. In column (1), Sunday overtime work is associated with a 2.3 pp and shift work a 1.1 pp reduction in separation risk, both at 1% significance level. For small firms in column (2), only Sunday overtime work is significant, about -1.0 pp, at 1% level. In turn, for large firms, the estimated coefficients of undesirable work schedules are significant and qualitatively similar as reported in

column (1). Compared to prime-aged workers 40-44 years old, age-groups 30-34 and 35-39 years old are positively associated with separation at 1% level in column (1). The parameter estimate for the former group implies about 2 pp greater risk of separation, while for the latter separation risk is about 1% smaller. These findings are qualitatively similar for small and large firms reported in columns (2) and (3); they are also substantially similar to those reported earlier for white-collar workers in Table 3. While the separation risk for 45-49 years old workers is significant in column (3) for large firms only (about -0.4 pp at 10% level), the oldest group of workers (50-53 years old) is consistently associated with about a 17 pp greater risk of separation. As noted earlier, employers might age discriminate older workers and this might be one potential explanation for this very sizeable estimate. The association between educational level and separation is positively significant for all levels of education in columns (1)-(3). Hence, irrespective of employer size, compared with the reference group (tertiary-level education), low- and highly-educated workers are associated with an enhanced risk of separation. However, compared to large firms, workers with a bachelor-level (or above) education face about 4 pp higher risk of separation in small firms, while for workers with primary-level education the separation risk is about 1 pp (1.7 pp) greater in small (large) firms, both at the 1% significance level.

Finally, as robustness checks, we undertake three supplementary exercises. Two of these auxiliary regressions mirror those undertaken for white collar workers – first we use individual worker total earnings instead of within-firm earnings quartiles, and second we add a measure of firm performance in order to distinguish between voluntary and involuntary separation. The findings (not reported here but available upon request) are qualitatively unchanged. To deal with the potential problem posed by blue-collar workers who receive both individual (II) and group incentive (GI) pay, in the third regression we add a measure of the incidence of combined individual and group incentive pay (as % of the worker annual earnings). We continue to find that group incentive pay is insignificant. The size of individual incentive pay estimate is unchanged, but now it is significant at 1 % level (previously

at 5 % level). Interestingly, we find that combined incentive pay (II&GI) is negatively significant (-0.001) at 10 % level. For small firms, the results are qualitatively intact for individual and group incentive pay, while combined incentive pay is highly insignificant. For large firms, the findings are qualitatively similar as those for all firms discussed above. In order to save space, we do not discuss here in more detail the findings for combined incentive pay (but these are available upon request).

[TABLE 4 ABOUT HERE]

6. Conclusions and Implications

Using a large longitudinal data set for full-time white-collar and blue-collar manufacturing male workers from Finland, we have investigated the association between worker separation and performance pay. In particular, for the first time, rigorous evidence on the association between worker separation and specific forms of performance pay, including both individual incentive pay and group incentive pay, is provided. To account for possible heterogeneous effects on separation of performance pay among different types of workers, we control for the formal level of education and occupation as well as time-invariant heterogeneity across firms (productive firms may simply pay their employees more than less-productive firms, which may decrease worker turnover).

The key finding for white-collar workers is that group incentive pay is associated significantly with *increased* probability of separation and hence *diminished* employment stability, but in large firms only. In terms of economic significance, a 10-percentage-point increase in group incentive pay (as % of worker total earnings) will *increase* the risk of separation about 2 pp. The finding is at odds with recent economics literature (including behavioral and experimental work) as well as propositions in the managerial and psychological literature that stress diverse mechanisms by which performance pay strengthens employee commitment to the firm. By contrast, this finding is consistent with theorists who stress possible adverse effects of performance pay on employment stability by arguing that

performance pay allegedly leads to enhanced stress, deteriorating industrial relations and free riding (e.g. Lazear (2000) and Fehr and Gaechter (2000)).

For blue-collar workers our findings reveal a different story. Our results consistently indicate that individual incentive pay is associated with a *decreased* probability of separation and hence *enhanced* employment stability, both in small and large firms. In terms of economic significance, a 10-percentage-point increase in the relative size of group incentive pay is linked to about 1-2 pp *decrease* in the risk of separation and thus enhances employment stability. As such, the finding is consistent with recent economics literature (including behavioral and experimental work) as well as propositions in the managerial and psychological literature that stress diverse mechanisms by which performance pay strengthens employee commitment to the firm. By contrast, this finding is at odds with theorists who stress possible adverse effects on employment stability by arguing that performance pay allegedly leads to enhanced stress, deteriorating industrial relations and free riding (e.g. such as Parent (1999) and Paarsch and Shearer (2000).)

Our investigations also reveal a number of interesting findings concerning other covariates. Earnings inequality is associated with an increased risk of separation for white-collar workers in small firms. Thus for some white-collar workers this finding provides evidence in support of the power of the fair wage hypothesis, but no such evidence for blue collar workers. One potential explanation for this finding could be that white-collar worker earnings are less compressed than blue-collar worker earnings in Finland. Education is found to influence separation for both groups of workers. Low- and highly educated white-collar workers face about a 0.9-2.3 pp greater risk of separation compared with mean educated workers while for blue-collar workers, compared with mean educated, the highly-educated are associated with over a 7 pp greater risk of separation in small firms and over 3 pp in large firms. As such these findings provide some support for both the role of skill biased technical change and the idea of job polarization. Consistent with the notion of compensation wage differentials we find

that undesirable work schedules are always associated with a reduced risk of separation. Finally we find that oldest group of workers (50-53 years old) is consistently associated with a large (about 17-19 pp) and greater risk of separation compared to prime-aged workers (40-44 years old.)

We recognize potential limitations in our study. Even though using longitudinal data and a large number of observations, we are not easily able to distinguish firm-initiated involuntary layoffs from worker-initiated voluntary quits. However, we try to minimize the problem by focusing on full-time male employees during a period with no severe economic downturns. Also, in Finland these full-time workers enjoy strong employment protection, and in the absence of severe economic downturns during the study period, we are reasonably confident that the bulk of separations are voluntary. Also one of our robustness exercises introduced a measure of firm performance and findings were essentially unaffected. In addition, we control for differences across regions firms operate by regional unemployment rates as well as region fixed effects. Further, we exclude all worker-year observations of firm disclosure year from our sample. We also stress that, on theoretical grounds, the distinction between layoffs and quits is ambiguous because employers can always try to hound their workers out of a job (e.g. by reducing worker wages, reallocating work-tasks, or providing generous severance payment for volunteer movers). Further, in out-of-job transitions to outside of the data we are unable to distinguish transitions to unemployment, out of labor force or other non-EK firms (e.g., small firms or other sectors). Also we do not have information on the characteristics of workers' families such as partners' age, earnings and the number of children. Despite these limitations, however, we believe our data have captured the key determinants of separation.

Our findings suggest that using fiscal incentives to promote performance pay can be a viable policy tool to enhance employment stability. In so doing, policymakers ought to be cognizant that: (i) not all performance pay is created equal---individual incentive pay and group incentive pay may affect employment stability differently; and (ii) not all workers are affected by performance pay equally---

white-collar and blue-collar workers respond to performance pay differently. The aforementioned limitations notwithstanding, our findings point to a specific policy recommendation---policymakers who are interested in promoting performance pay to enhance employment stability may want to use fiscal incentives to promote individual incentive pay for blue-collar workers and discourage firms to use group incentive pay for white-collar workers.

Table 1. Summary Statistics for White-Collar Workers

	(1) Mean	(2) Std. Dev.	(3) Min	(4) Max
Worker separation (0/1)	0.115	0.319	0	1
Performance Pay				
Group Incentive Pay (% of worker annual earnings if Group Incentive Pay>0)	5.14	4.49	0.001	82.83
Group Incentive Pay (€) (if Group Incentive Pay>0)	2,238	2,641	0.880	105,946
Incidence of Group Incentive Pay (0/1)	0.582	0.493	0	1
Annual real earnings (€)	37,963	12,245	12,879	188,138
Log(annual real earnings)	10,50	0.295	9.46	12.14
Undesirable work schedules				
Sunday overtime work (0/1)	0.352	0.477	0	1
Shift work (0/1)	0.108	0.311	0	1
Worker age				
25-29 years	0.084	0.277	0	1
30-34 years	0.170	0.376	0	1
35-39 years	0.185	0.388	0	1
40-44 years	0.184	0.387	0	1
45-49 years	0.180	0.384	0	1
50-53 years	0.197	0.398	0	1
Worker educational level				
Primary, 6-9 years or missing	0.059	0.235	0	1
Upper secondary, 11-12 years	0.169	0.374	0	1
Lowest tertiary, 13-14 years	0.299	0.458	0	1
Bachelor, 14-16 years	0.271	0.445	0	1
Master or above, 16-23 years	0.202	0.402	0	1
Employer size				
30-49 employees	0.052	0.222	0	1
50-99 employees	0.142	0.349	0	1
100-249 employees	0.252	0.434	0	1
250-499 employees	0.184	0.387	0	1
500-999 employees	0.141	0.348	0	1
>1000 employees	0.229	0.420	0	1
Number of firms	565			
Number of workers	58,749			
Number of observations	229,117			

Source: Linked Employer-Employee Data from the EK

Notes: Summary statistics are based on the underlying white-collar male sample, except employer size that is constructed using full white-collar sample (i.e. including both female and male workers) to measure more accurately employer size. All figures in the table present unconditional sample means (unless indicated otherwise) over the pooled data 1997-2006 that are used in the estimations. Earnings are in real terms (deflated by the CPI deflator).

Table 2. Summary Statistics for Blue-Collar Workers

	(1) Mean	(2) Std. Dev.	(3) Min	(4) Max
Worker separation (0/1)	0.145	0.352	0	1
Performance Pay Group Incentive Pay (% of worker annual earnings if Group Incentive Pay>0)	4.19	3.19	0.003	42.39
Individual Incentive Pay (% of worker annual earnings if Individual Incentive Earnings>0)	16.35	4.82	0.003	45.47
Group Incentive Pay (€) (if Group Incentive Pay>0)	1,024	822	1	12,867
Individual Incentive Pay (€) (if Individual Incentive Pay>0)	4,659	1,251	1	14,270
Incidence of Group Incentive Pay (0/1)	0.164	0.370	0	1
Incidence of Individual Incentive Pay (0/1)	0.393	0.488	0	1
Incidence of both Group and Individual Incentive Pay (0/1)	0.249	0.432	0	1
Annual real earnings (€)	28,868	6,595	11,183	82,675
Log(annual real earnings)	10.24	0.23	9.32	11.32
Undesirable work schedules				
Sunday overtime work (0/1)	0.853	0.354	0	1
Shift work (0/1)	0.855	0.352	0	1
Age category				
25-29 years	0.106	0.308	0	1
30-34 years	0.153	0.360	0	1
35-39 years	0.167	0.373	0	1
40-44 years	0.181	0.385	0	1
45-49 years	0.200	0.400	0	1
50-53 years	0.192	0.394	0	1
Educational level				
Primary, 6-9 years or missing	0.262	0.440	0	1
Upper secondary, 11-12 years	0.696	0.460	0	1
Lowest tertiary, 13-14 years	0.037	0.189	0	1
Bachelor or above, 14- years	0.005	0.068	0	1
Employer size				
30-49 employees	0.039	0.194	0	1
50-99 employees	0.107	0.309	0	1
100-249 employees	0.234	0.424	0	1
250-499 employees	0.209	0.406	0	1
500-999 employees	0.170	0.375	0	1
>1000 employees	0.241	0.428	0	1
Number of firms	660			
Number of workers	80,338			
Number of observations	340,344			

Source: Linked Employer-Employee Data from the EK

***Notes**:* Summary statistics are based on the underlying blue-collar male sample, except employer size that is constructed using full blue-collar sample (i.e. including both female and male workers) to measure more accurately employer size. All figures in the table present unconditional sample means (unless indicated otherwise) over the pooled data 1997-2006 that are used in the estimations. Earnings are in real terms (deflated by the CPI deflator).

Table 3. Worker Separation under Performance Pay: White-Collar Workers

	(1) All firms	(2) Small firms (emp.<100)	(3) Large firms (emp.>100)
Group Incentive Pay (as of Worker Annual Total Earnings, %)	0.002 * (0.001)	0.001 (0.001)	0.002 * (0.001)
Earnings Inequality	0.180 (0.129)	0.291 *** (0.108)	0.108 (0.204)
Worker Earnings Quartile (ref. Q3)			
Q1	0.011 *** (0.003)	0.008 (0.005)	0.011 *** (0.004)
Q2	0.005 *** (0.002)	0.000 (0.004)	0.006 *** (0.002)
Q4	0.003 (0.003)	0.007 * (0.004)	0.003 (0.003)
Undesirable work schedules			
Sunday overtime work (0/1)	-0.009 ** (0.005)	-0.013 ** (0.006)	-0.008 (0.005)
Shift work (0/1)	-0.009 ** (0.004)	-0.014 ** (0.006)	-0.008 ** (0.004)
Worker age (ref. 40-44 years)			
25-29 years	0.004 (0.004)	0.010 * (0.006)	0.002 (0.005)
30-34 years	0.020 *** (0.003)	0.028 *** (0.005)	0.018 *** (0.004)
35-39 years	0.009 *** (0.002)	0.012 *** (0.004)	0.008 *** (0.002)
45-49 years	-0.007 *** (0.002)	-0.010 *** (0.003)	-0.008 ** (0.003)
50-53 years	0.194 *** (0.003)	0.186 *** (0.005)	0.195 *** (0.004)
Worker educational level (ref. lowest tertiary, 13-14 years) Primary, 6-9 years or missing	0.019 *** (0.003)	0.009 * (0.005)	0.021 *** (0.003)
Upper secondary, 11-12 years	-0.001 (0.002)	0.004 (0.003)	-0.002 (0.003)
Bachelor, 14-16 years	0.004 ** (0.002)	0.009 ** (0.004)	0.003 (0.002)
Master or above, 16-23 years	0.021 *** (0.003)	0.023 *** (0.005)	0.020 *** (0.004)
Adjusted R^2	0.173	0.215	0.171
Number of firms	565	409	239
Number of workers	58,749	13,177	48,658
Number of observations	229,117	44,367	184,750

Source: Linked Employer-Employee Data from the EK

Notes: Estimates are based on the linear probability models for male workers for 1997-2005. The dependent variable (0/1) equals one if the worker separates in the year *t* from the firm s/he worked in the previous year *t-1*, and zero otherwise. Standard errors in parentheses are adjusted for clustering at the firm level. Significance levels: * 10%; ** 5%; *** 1%, respectively. Earnings Inequality is the within-firm standard deviation of worker earnings in a given year. Worker Earnings Quartile is the within-firm worker earnings quartile in a given year. All models also include a constant term, 23 industry dummies, year dummies, worker job tenure in 1997 (to control for the length of worker tenure prior to 1997), 5 regional dummies, firm dummies (fixed effects), 6 employer size dummies, 3-digit occupational groups and annual regional unemployment rates (%). All included covariates are one-year lagged.

Table 4. Worker Separation under Performance Pay: Blue-Collar Workers

	(1) All firms	(3) Small firms (emp.<100)	(3) Large firms (emp.>100)
Group Incentive Pay (as of Worker Annual Total Earnings, %)	0.001 (0.002)	-0.001 (0.002)	0.001 (0.003)
Individual Incentive Pay (as of Worker Annual Total Earnings, %)	-0.001 *** (0.000)	-0.002 *** (0.000)	-0.001 ** (0.000)
Earnings Inequality	0.063 (0.060)	0.030 (0.046)	0.066 (0.092)
Worker Earnings Quartile (ref. Q3) Q1	0.007 ** (0.003)	0.013 *** (0.005)	0.005 * (0.003)
Q2	0.007 *** (0.002)	0.013 *** (0.004)	0.007 *** (0.002)
Q4	-0.008 *** (0.002)	-0.010 *** (0.004)	-0.008 *** (0.003)
Undesirable work schedules Sunday overtime work (0/1)	-0.023 *** (0.004)	-0.010 ** (0.005)	-0.023 *** (0.004)
Shift work (0/1)	-0.011 *** (0.004)	-0.005 (0.005)	-0.014 *** (0.004)
Worker age (ref. 40-44 years) 25-29 years	0.002 (0.002)	0.004 (0.005)	0.002 (0.002)
30-34 years	0.019 *** (0.002)	0.023 *** (0.005)	0.019 *** (0.002)
35-39 years	0.008 *** (0.002)	0.009 *** (0.004)	0.007 *** (0.002)
45-49 years	-0.004 ** (0.002)	0.001 (0.004)	-0.004 ** (0.002)
50-53 years	0.174 *** (0.002)	0.174 *** (0.004)	0.173 *** (0.002)
Worker educational level (ref. upper secondary, 11-12 years) Primary, 6-9 years or missing	0.016 *** (0.002)	0.009 *** (0.003)	0.017 *** (0.002)
Lowest tertiary, 13-14 years	0.015 *** (0.003)	0.019 ** (0.009)	0.015 *** (0.004)
Bachelor or above, over 14 years	0.040 *** (0.010)	0.071 *** (0.027)	0.034 *** (0.010)
Adjusted R^2	0.154	0.190	0.154
Number of firms	660	406	326
Number of workers	80,338	14,291	68,587
Number of observations	340,344	49,867	290,477

Source: Linked Employer-Employee Data from the EK

***Notes**:* Estimates are based on the linear probability models for male workers for 1997-2005. The dependent variable (0/1) equals one if the worker separates in the year *t* from the firm s/he worked in the previous year *t-1*, and zero otherwise. Standard errors in parentheses are adjusted for clustering at the firm level. Significance levels: * 10%; ** 5%; *** 1%, respectively. Earnings Inequality is the within-firm standard deviation of worker earnings in a given year. All models also include a constant term, 23 industry dummies, year dummies, worker job tenure in 1997, , 5 regional dummies, firm dummies (fixed effects), 6 employer size dummies, 3-digit occupational groups and annual regional unemployment rates (%). All included covariates are one-year lagged.

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