Does Horizontal Pay Dispersion Impair Firm Performance? The Role of Task Complexity

Sinikka Lepistö and Anna Rossi

Abstract

Using Finnish white-collar employee (WCE) compensation panel data, we study a moderating role of task complexity in the relation between WCE horizontal pay dispersion and firm performance. The key assumption underlying our research hypothesis is that due to the lack of appropriate performance measures, task complexity leads to greater subjectivity in the evaluations of employees' performance and expertise. As a result of these forces, we expect the disincentive effect of horizontal pay dispersion to be more pronounced for WCEs involved in more complex tasks, thereby leading to deterioration in organizational performance. In the empirical analysis, we classify WCEs according to the complexity of tasks they perform into clerical, expert, senior expert, and managerial categories. We find that the negative relationship between WCE pay dispersion and firm performance is attributable primarily to the expert and senior expert WCEs, who are involved in complex knowledge-based tasks, supporting our hypothesis.

Keywords:

WCE, pay dispersion, performance, task complexity

Acknowledgements

We would like to thank the Confederation of Finnish Industries and Suomen Asiakastieto for providing the data for this research and Seppo Ikäheimo for helping to obtain the data. This paper benefited from constructive comments and suggestions provided by Sami Vähämaa (the editor), Juha-Pekka Kallunki, Seppo Ikäheimo, and seminar participants at the University of Oulu. All of the remaining errors are our own.

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1. Introduction

Employee compensation is argued to affect employees' effort, which, in turn, determines organizational performance outcomes. It is further assumed that individuals perceive their compensation not only in absolute amount but also by comparing their compensation to that of their co-workers or otherwise similar social groups (e.g., Baron & Pfeffer, 1994). Thus, the dispersion of employee pay within organizations represents an important feature of the compensation schemes and a mechanism through which employees' effort may be affected. Two theoretical perspectives make opposing predictions regarding the relationship between pay dispersion and organizational performance. On the one hand, tournament theory suggests that a larger dispersion of pay should motivate employees to exert greater effort in order to win a prize of the highest salary (Lazear & Rosen, 1981). On the other hand, building on the theories of distributive justice and social fairness, fair-wage hypothesis predicts the detrimental effect of pay dispersion on both individual and group performance because of undermined morale (Akerlof & Yellen, 1990; Levine, 1991).

Given the opposing predictions of the theories, the research challenge is, thus, to identify the organizational settings where either of the effects is likely to dominate. An underlying assumption of the tournament theory lies in the possibility of employees' promotion to the next level in the organizational hierarchy. The focus of the tournament theory is, thus, on the vertical pay dispersion, that is, differences in employee pay levels across organizational levels. The fair wage hypothesis, in turn, focuses on the employee pay dispersion within the same organizational level.

Existing empirical literature primarily addresses the performance effects of vertical pay dispersion in managerial groups (e.g., Leonard, 1990; Main, O'Reilly, & Wade, 1993; Eriksson, 1999; Lee, Lev, & Yeo, 2008; Kale, Reis, & Venkateswaran, 2009), while only a few studies investigate implications of vertical pay dispersion of the firm workforce as a whole (Winter-Ebmer & Zweimuller, 1999; Lallemand, Plasman, & Rycx, 2004; Heyman, 2005). However, the implications of horizontal pay dispersion of the non-managerial WCEs, who constitute the majority of the organizational workforce, remain relatively unexplored in the literature. Furthermore, existing literature lacks empirical evidence on the performance consequences of employee incentives at different horizontal levels of organizational hierarchies.

In this paper, we contribute to the debate on the effects of pay differentials by studying the performance implications of WCE horizontal pay dispersion in a sample of Finnish manufacturing companies and, more specifically, by considering the moderating role of WCE task complexity in this relation. The dataset we employ contains standardized occupational descriptions, allowing us to group WCEs into organizational levels based on their task complexity and to model the relation between firm performance and WCE horizontal pay dispersion at each of the task complexity levels considered jointly. Our primary argument is that task complexity leads to subjectivity in evaluations of employees' performance and expertise and, as a result, to greater bargaining power of employees in the pay-setting process and greater pay dispersion. We, therefore, posit that due to greater subjectivity in pay setting, the disincentive effect of horizontal pay dispersion predicted by the fair-wage hypothesis should become more pronounced for WCEs involved in more complex tasks and thus be reflected in the deterioration of firm performance.

The Finnish WCE setting we focus on possesses several characteristics that facilitate our empirical analysis. Specifically, fixed salary constitutes the majority of compensation of Finn-

ish WCEs[1] and, as such, represents the primary compensation component on which employees base their equality perceptions. As opposed to variable compensation, which is typically paid according to pre-determined performance targets, fixed salary is performance-insensitive and determined by a subjective evaluation of expertise and other personal characteristics of employees. Hence, an environment where fixed compensation prevails in the employees' compensation package arguably represents a powerful setting to test our hypotheses. Another feature of Finnish institutional environment is that similar to other Nordic countries, Finland is known for its financial transparency as reflected in the public nature of individual tax information, making organizations in this geographical region particularly well-suited for studying consequences of the organizational pay dispersion (e.g., Kacperczyk & Balachandran, 2018).

We test our predictions using a sample containing 1,305 firm-year observations over the period 2002-2007. In support of the assumption that the task's complexity affects pay dispersion, we find that pay dispersion measures (measured as a standard deviation of pay, variance ratio, and range) increase with the level of task complexity. In the primary regression analysis, we regress various measures of accounting performance on the measures of WCE fixed pay dispersion at each of the task complexity levels (non-executive managers, senior experts, experts, and clerks). Consistent with our hypothesis, the results of this analysis show that pay dispersion measures in groups of experts and senior experts, that is, the WCEs facing high task complexity, are significantly negatively related to measures of accounting profitability. Further, the pay dispersion of employees engaged in low-complexity tasks is not related to firm performance outcomes, also in line with our predictions. Taken together, our results provide support for the prediction of the moderating effect of task complexity on the relation between WCE pay dispersion and firm performance.

We note that the main results hold when we use alternative definitions of pay dispersion, including range, the standard deviation of pay, coefficient of variation, and the standard deviation of pay that is unexplained by demographic factors such as employee's age and education, among others. This relation is also robust to the use of several alternative measures of accounting performance, including return on assets, profit margin, return on capital employed, and sales per employee. Finally, our results are generally robust to the use of firm fixed effects.

Our study contributes to the literature on the consequences of employee pay dispersion by investigating the joint effect of WCE horizontal pay dispersion in different task complexity categories on firm performance outcomes. Several other studies also address the relation between WCE pay dispersion and corporate performance (Hibbs & Locking, 1999; Lallemand et al., 2004; Heyman, 2005; Hunnes, 2009). However, these studies neither model the effects of *horizontal* pay dispersion at different organizational levels jointly, nor investigate the role of employee group job complexity in this relation. Importantly, unlike most of the studies in this literature, we focus not only on white-collar *managers* but on all WCEs involved in diverse non-managerial tasks and model how the job-related attribute such as task complexity affects the relation between their pay dispersion and performance.

2. Literature review and hypothesis development

The debate on group-based compensation schemes has evolved around two influential theoretical perspectives, which make competing predictions regarding the relationship between employee pay dispersion and organizational performance.

1 For example, Ikäheimo, Kallunki, Moilanen, & Schiehll (2018) report that the average performance-based incentive for WCEs is only 1.78% of the fixed salary in Finland.

Viewing pay of a higher-ranked employee (typically a CEO) as a prize in the promotion game, proponents of the tournament theory (Lazear & Rosen, 1981; Rosen, 1986) focus on motivational effects of employee pay dispersion. This agency-theoretical perspective argues that employees are incentivized by higher compensation levels of their relatively higher-ranked co-workers that leads to increased equilibrium effort and, as a result, to improved overall organizational performance. Because compensation of higher-ranked employees is regarded as a potential prize for lower-level employees, the focus of the tournament theory is on the vertical pay dispersion, i.e., pay dispersion across hierarchical levels of organizations. Implicit in this view is also the assumption of an employee's promotion possibility to higher organizational levels, complete with a possible increase in compensation (i.e., size of the promotional prize) being known in advance. The tournament theory recognizes, however, that the rank-order tournament game may also create incentives for collusion amongst employees, because such uncooperative behavior may also increase the chances of the participants to win the promotion contest (e.g., Lazaer, 1989).

An alternative theoretical perspective is rooted in sociology and psychology research. Drawing on the theory of equity (Adams, 1963) and the theories of relative deprivation and social exchange (Blau, 1955; Homans, 1961), Akerlof & Yellen (1990) develop a fair wage-effort hypothesis, according to which, more dispersed compensation of group members creates perceptions of unfairness that undermines morale and leads to the deterioration of organizational performance. As opposed to the tournament theory, the fair wage-effort hypothesis focuses primarily on the horizontal pay dispersion by predicting the adverse performance consequences of the pay dispersion to be concentrated among employees with similar duties at the same organizational levels.[2] The theory further differentiates between the notions of pay inequity and pay inequality. Specifically, the pay inequity implies a disparity in the absolute amounts of compensation without regard for the inputs supplied by each team member (e.g., Adams, 1963). Yet, paying each team member the same compensation without considering his or her individual inputs may also be regarded as unfair. The notion of pay equality thus stipulates compensating employees in proportion to their contributed input of effort (Leventhal, 1976; Porter & Steers, 1983). However, because the employees' amounts of input may be difficult to measure and because of humans' tendency to overestimate own contributions relative to others, large pay disparities even irrespective of the individuals' productive input may create perceptions of unfairness (Bloom, 1999; Cowherd & Levine, 1992; Martin, 1981; Pfeffer & Langton, 1993).

A number of subsequent studies test predictions of these theories empirically. The largest strand in this literature focuses on testing the tournament theory by relating pay dispersion in the group of top executives to firm performance. With some exceptions (e.g., Conyon, Peck, & Sadler, 2001), these studies generally find a positive relationship between measures of pay disparity and various measures of firm performance (e.g., Leonard, 1990; Main et al., 1993; Eriksson, 1999; Lee et al., 2008; Kale et al., 2009). Several other studies extend this line of research by including in their measures of pay dispersion compensation of employees below management level of corporate hierarchy (Hibbs & Locking, 2000; Lallemand et al., 2004; Heyman, 2005; Rouen, 2020) and generally report results supportive of the tournament theory.

2 Building on similar arguments, the relative depravation theory suggests that individuals compare their pay to that of others at higher organizational ranks (Cowherd & Levine, 1992; Martin, 1981; Henderson & Fredrickson, 2001), implying that individuals may be demotivated not only by horizontal, but also by large vertical pay disparities.

Unlike the tests of the effect of vertical pay dispersion, the implications of employee horizontal pay dispersion received less attention in the academic literature. The evidence on the adverse effects of horizontal pay dispersion comes primarily from non-corporate settings, including the performance of sports teams (e.g., Jewell & Molina, 2004; Sommers, 1998; Franck & Nuesch, 2011) and academic departments (Pfeffer & Langton, 1993). In business settings, exceptions include Ding, Akhtar, & Ge (2009), who relate both vertical and horizontal pay dispersion to sales growth and product/service quality in a sample of Chinese organizations and Hunnes (2009), who study similar effects in Norwegian organizations. Limiting the analysis to top management team members, Siegel & Hambrick (2005), address the effect of managers' horizontal pay dispersion on firm performance and its interaction with the companies' needs for coordination among managers. Additionally, Shaw, Gupta, & Delery (2002) investigate a moderating impact of task interdependence on the effects of pay dispersion in the trucking industry. Job-related attributes other than coordination needs or task interdependence have not, however, received sufficient attention in the academic literature on horizontal pay dispersion.

Among the job-related attributes, which may potentially affect pay dispersion and its perceptions among employees, is the complexity of the tasks employees perform. The task complexity can be conceptualized with the degree of knowledge required from an employee to solve a specific problem. Garicano (2000) develops a theory of knowledge hierarchies where employees at the higher organizational layers handle the most difficult problems and lower-level employees deal with the most routine problems. To map the concept of knowledge hierarchies into empirical measures, Caliendo, Monte & Rossi-Hansberg (2015) utilize information on organizational occupational categories of French organizations, while Tag (2013) validates that Swedish occupational categories can be used to construct the knowledge-based hierarchies. We build on this literature by assuming that employees at higher organizational ranks face more knowledge-based tasks and that occupational categories capture the groups of employees with similar characteristics, knowledge, and the level of task complexity.

For employees, who are engaged in more complex tasks and whose performance outcomes are not directly observable, pay-setting and performance evaluations are often subjective (e.g., Prendergast, 1999; Baik, Evans, Kim, & Yanadori, 2016). The subjectivity in performance evaluations is, for example, posited to affect the strength of monetary and promotional incentives across hierarchical levels. Supporting this assumption, Brown (1990) and MacLeod & Parent (2000) report that more complex tasks are associated with lower use of incentive pay. As also noted by Milkovich, Newman, & Gerhart (2011, p. 491), firms "struggle to figure out what [their] pay should be" because of the difficulty in measuring employees' knowledge-based outputs. Due to the multidimensional nature of tasks and greater subjectivity and flexibility in performance evaluations, we expect employees engaged in more complex tasks to have greater bargaining power vis-à-vis an employer in the pay negotiations resulting in greater horizontal pay dispersion relative to employees engaged in easier tasks, leading to the first hypothesis:

H1: Employee horizontal pay dispersion increases with the level of task complexity.

Our second prediction posits that the strength of the relationship between horizontal pay dispersion and organizational performance will differ depending on the job complexity level of the employee group. Compensation differences within the same organizational levels may result from legitimate factors such as performance and seniority (Milkovich et al., 2011; Gupta, Conroy, & Delery, 2012), but may also indicate supervisor's subjective preferences among em-

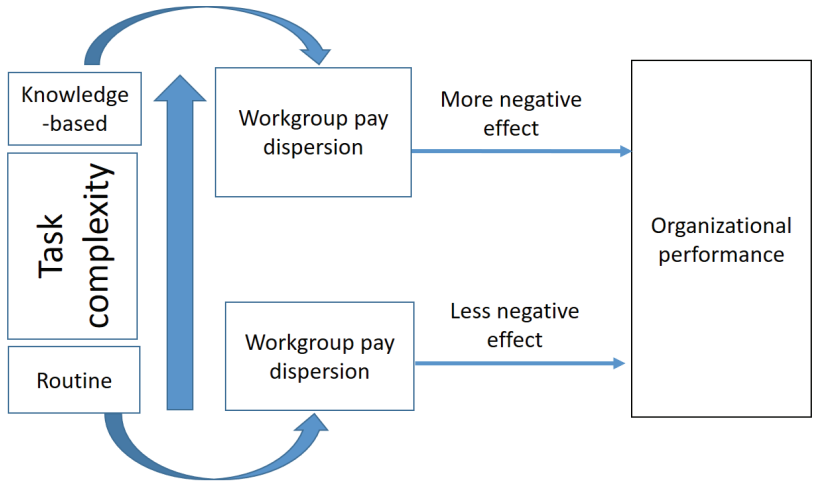
ployees (Gupta & Jenkins, 1996) or may signal that employees have different economic value to the organizations (Siegel & Hambrick, 2005). Several studies provide evidence that pay differences may result from non-legitimate political influence, that is, the exercise of power on the decision-maker (Fossum & Fitch, 1985; Welbourne & Trevor, 2000). Kepes, Delery, & Gupta (2009) further predict and find that pay differences resulting from such political behavior evoke stronger perceptions of unfairness among employees as opposed to pay differences resulting from legitimate factors.

When employees' inputs and outputs are not directly observable as in the case of complex knowledge-based tasks, there is less transparency regarding pay determination and more possibilities for the political behavior, as opposed to the pay-setting process of employees engaged in more routine jobs. The lack of transparency, thus, may open more room for non-legitimate pay practices. Hence, pay dispersion among groups of employees engaged in more complex tasks is likely to evoke stronger perceptions of injustice, leading to a greater decrease in employee effort and organizational performance as a result. These arguments lead to our second prediction that the disincentive effects of the WCE horizontal pay dispersion will be most pronounced among the groups of employees engaged in complex knowledge-based tasks:

H2: The negative relation between horizontal employee pay dispersion and firm performance is concentrated in the corporate organizational levels characterized by more complex tasks.

The conceptual model illustrating both of the hypotheses is presented in Figure 1.

Figure 1 Conceptual model



3. Data and methodology

3.1 Data sources

The data on each individual WCE's pay structure originates from a survey questionnaire administered by the Confederation of the Finnish Industries (Elinkeinoelämän Keskusliitto [EK]).[3] Although the survey covers the entire private sector, we analyze only the manufacturing companies, because the job codes of service companies do not contain a code of job complexities, our key variable of interest. The questionnaire was systematically mailed to all Finnish-based member firms of EK in October of each year during our sample period, from 2002 to 2007. These companies represent over 70 percent of the Finnish GDP and employ about 40 percent of the workforce in Finland. Since EK conducts this survey regularly among its member firms as a basis for its official salary statistics used in the subsequent labor union salary negotiations, response rates are high. The main fields of the survey ask for information on WCE pay components, including fixed monthly salary, annual bonus, and possible perquisites. The salaries are reported accurately, as with most companies, the information comes directly from the companies' pay systems. In addition to compensation details, the pseudonymized data contain information on firm location, employee gender, tenure, job code, displaying such information as job name and complexity level, and education level code according to the definition of Bureau of Statistics Finland.[4]

The accounting data needed to calculate the profitability, size, and degree of financial leverage of each firm-year are obtained from a publicly available Voitto+ database maintained by the credit bureau Suomen Asiakastieto Ltd. This database contains the financial statement information of all Finnish firms.

3.1 Research design and variable definitions

To test the relation between WCE pay dispersion and firm performance, we estimate the following baseline regression model:

$$PERF_{it} = \beta_0 + \times \sum_{n=1}^{4} \beta_n DISPARITY_{it} + \gamma' CONTROLS + \epsilon \qquad (1)$$

The dependent variable ($PERF_{it}$) is firm accounting performance measured as either return on assets (ROA_{it}) or net profit margin ($PROFIT\_MARGIN_{it}$). We measure the main test variable, $DISPARITY_{it}$, in several ways at each of the levels of job complexity.

First, we use the standard deviation of WCE fixed salaries (STD_SALARY_{it}) within the same task complexity level in a firm in a given year. Second, we compute the coefficient of variation ($VARIANCE\_RATIO_{it}$) in WCE fixed pay by dividing the STD_SALARY_{it} by a mean value of the employee fixed salary ($MEAN\_SALARY_{it}$) within the same task complexity level in a firm in a given year. Third, we compute the range of WCE fixed pay as a logarithmically transformed difference between the highest and the lowest pay ($LNGRANGE_{it}$) within the same complexity level in a given year. Fourth, in an attempt to distinguish between concepts of inequity versus inequality (e.g., Trevor, Reilly, & Gerhart, 2012), we compute the standard deviation of the portion of the fixed compensation, which is unexplained by demographic and other employee-specific fac-

3 The Confederation of Finnish Industries (https://ek.fi/en/) is the leading employers' business organization in Finland representing the entire private sector. Other studies using similar data include Huttunen, Pirttilä, & Uusitalo (2013) and Ikäheimo et al. (2018).

4 The full list of variables together with their definitions by industry (in Finnish) may be accessed at: https://ek.fi/jasenille/kyselyt-yrityksille/palkkatiedustelut/syyskuun-palkkatiedustelu/syyskuun-palkkatiedustelun-vastausohjeet/.

tors. Specifically, we calculate the standard deviation of the residuals ($STD\_RES\_SALARY_{it}$) from the following employee-level regression model estimated separately by industry and year:

$$SALARY_{jt} = \alpha_0 + \sum_{k=1}^{5} \delta_k \, EDUCATION_{jt} + \sum_{m=1}^{3} \varphi_m \, COMPLEXITY_{jt} + \alpha_1 TENURE_{jt} + \alpha_2 GENDER_{jt} + \alpha_3 AGE_{jt} + \alpha_4 CAPITAL_{jt} + \varepsilon \quad (2)$$

where $SALARY_{jt}$ is the employee's monthly fixed salary; $EDUCATION_{jt}$ is a categorical variable capturing employee's educational level (secondary, short-cycle tertiary, bachelor, master, doctoral, unknown) with 'unknown' representing a reference category; $COMPLEXITY_{jt}$ is a categorical variable capturing employee's task complexity level (non-executive managers, senior expert, experts, clerks) with 'clerks' representing a reference category; $TENURE_{jt}$ is the number of years the employee has worked in the company; $GENDER_{jt}$ is an indicator variable taking a value of one for male employees, and zero for females; AGE_{jt} is the employee's age; $CAPITAL_{jt}$ is an indicator variable taking a value of one if a company in which the employee works in a given year is located in Helsinki region; zero otherwise. We include the last variable to take into account higher salaries in the capital region. To estimate Eq. (2), we use all available employee-level information without any sample restrictions.

To identify groups of employees facing similar job complexity, we use information on the EK job code and follow the WCE classification of Coates (1986) into clerical, professional, and managerial. Each WCE in the data is originally placed into one of five task complexity categories, which follow survey data regarding the WCEs' responsibilities and task description according to the International Standard Classification of Occupations (ISCO) -classification. WCEs at Level 1 are non-executive managers who have subordinates and comprehensive responsibility for managing a reporting unit, such as a division, a department, or a production line. Level 1 WCEs make decisions about the business strategy and the operations of the managed unit as a whole (e.g., the quality and quantity of production, budget, and recruitment of personnel). WCEs at Level 2 consist of senior experts who work in demanding development and planning tasks and are accountable for the progress and results of their projects. Level 3 WCEs consist of technicians and professionals who work as experts in planning and implementation positions. They are also responsible for the progress and performance of projects. Finally, Level 4 consists of foremen with workers as direct subordinates, and Level 5 includes clerical support workers in departments such as customer service, bookkeeping, warehousing, sales, and production. Since WCEs at Levels 4 and 5 do more routine work than those at other levels, we combine these two groups into one for the purpose of our analysis, resulting in four task complexity categories.[5]

Returning to Eq. (1), γ is a vector of control variables. Specifically, we control for firm size with a natural logarithm of annual sales ($SIZE_{it}$), for firm riskiness with equity-to-assets ratio ($EQRATIO_{it}$), and for growth using percentage change in annual sales ($SALES\_GROWTH_{it}$). We also control for the proportion of white-collar employees in the total firm's workforce, which we define by dividing the number of WCEs from the EK survey by the total number of employees as reported in the Voitto+ database (WCE_PERC_{it}). This ratio is a rough approximation of the white-to-blue ratio used in related studies (e.g., Lallemand et al., 2004; Hunnes, 2009). When estimating the regressions, we also use both industry and yearly fixed effects and cluster

5 While employees at Levels 2 and 3 also perform tasks of similar complexity, we do not combine those groups, because that would result in a disproportionately larger number of observations relative to other categories. See Table 2 Panel A for the breakdown of the sample by the complexity level groups.

standard errors by firm. In additional specifications, we employ firm-fixed effects instead of industry-fixed effects. Detailed definitions of all of the variables appear in Appendix 1.

To construct our sample, we keep full-time employees (37.5 – 40 working hours per week) and require the availability of employee-level variables necessary to estimate Eq. (2) and the firm-level variables necessary to estimate Eq. (1). In order to calculate pay dispersion measures, we require at least three persons being employed at each of the four job complexity levels described above. After applying these screens, we are left with 1,305 firm-year observations (425 unique firms) over the period 2002-2007.

4. Empirical results

4.1 Descriptive statistics and univariate analysis

Table 1 reports employee- and firm-level descriptive statistics of the variables used in the empirical analysis. To mitigate any impact of extreme observations, we truncate variables expressed as ratios ($PROFIT\_MARGIN_{it}$, ROA_{it}, $EQRATIO_{it}$, $SALES\_GROWTH_{it}$) at the 1st and 99th percentile of the distribution. Average salary Panel B is 2,953 euros and the median is 2,916 euros, suggesting that there are no large outliers in the compensation variable. The median number of WCEs ($WHITE\text{-}COLLAR\ EMPLOYEES_{it}$) in our sample companies is 100, constituting roughly 34% of that company's total workforce (WCE_PERC_{it}). An average company in the sample has approximately 47% of equity in its capital structure and the majority of companies are profitable.

The descriptive statistics of the pay disparity measures presented in Table 1 also offer support for Hypothesis 1, which states that employee horizontal pay dispersion increases with task complexity. Specifically, both the mean and median values of all pay disparity measures (STD_SALARY_{it}, $STD\_RES\_SALARY_{it}$, $VARIANCE\_RATIO_{it}$, $LNRANGE_{it}$) increase as we move from the jobs characterized by the easiest tasks (Level 4) to the jobs characterized by the most complex tasks (Level 1). For example, Table 1 illustrates that the median standard deviation of salary at Level 4 is 267 euros, whereas at Level 3 it almost triples to 719 euros. Notably, the differences in the pay disparity measures between senior experts (Level 2) and non-executive managers (Level 1) are less pronounced relative to differences between Level 2 and lower levels.

Table 2 further presents the distribution of the employee-level sample by the level of job complexity (Panel A) and by the level of education (Panel B). As reported in Panel A, the majority of the WCEs are employed in expert and senior expert positions. Moreover, Panel B reports that half of the sample employees have either short-cycle tertiary or bachelor-level education.

Table 1 Descriptive statistics

VARIABLE	MIN	Q1	MEDIAN	MEAN	Q3	MAX	STD DEV
Panel A: Employee-level variables							
$SALARY_{jt}$	284.00	2397.00	2928.00	3186.81	3710.00	29608.11	1143.10
$TENURE_{jt}$	0.00	2.00	7.00	10.91	17.00	50.00	10.46
$GENDER_{jt}$	0.00	0.00	1.00	0.65	1.00	1.00	0.48
AGE_{jt}	18.00	34.00	41.00	42.00	50.00	100.00	10.06
$CAPITAL_{jt}$	0.00	0.00	0.00	0.26	1.00	1.00	0.44
Panel B: Firm-level variables							
$WHITE\text{-}COLLAR\ EMPLOYEES_{it}$	15.00	52.00	100.00	266.97	181.00	21649.00	1319.88
WCE_PERC_{it}	0.02	0.24	0.34	0.40	0.51	1.00	0.21
$MEAN\_SALARY_{it}$	1829.75	2678.96	2916.26	2952.90	3189.73	5427.01	404.91
$STD\_SALARY1_{it}$	18.73	603.56	885.49	945.16	1221.13	3975.04	480.49
$STD\_SALARY2_{it}$	93.22	549.44	718.72	729.05	880.97	1816.19	254.13
$STD\_SALARY3_{it}$	68.61	333.80	426.47	459.68	547.39	2037.95	190.65
$STD\_SALARY4_{it}$	24.66	198.22	266.85	291.70	353.98	3863.53	185.19
$STD\_RES\_SALARY1_{it}$	11.41	557.70	820.52	874.07	1112.50	3851.40	451.95
$STD\_RES\_SALARY2_{it}$	70.06	481.14	634.21	644.59	779.00	1691.97	225.22
$STD\_RES\_SALARY3_{it}$	93.94	308.07	381.55	409.96	480.45	1717.06	160.60
$STD\_RES\_SALARY4_{it}$	10.85	230.15	284.47	301.15	347.66	3334.16	155.09
$VARIANCE\_RATIO1_{it}$	0.01	0.14	0.19	0.20	0.25	0.61	0.08
$VARIANCE\_RATIO2_{it}$	0.03	0.16	0.20	0.20	0.24	0.41	0.06
$VARIANCE\_RATIO3_{it}$	0.03	0.13	0.16	0.17	0.20	0.47	0.06
$VARIANCE\_RATIO4_{it}$	0.01	0.10	0.13	0.13	0.16	0.83	0.06
$LNRANGE1_{it}$	3.61	7.34	7.84	7.75	8.25	9.64	0.71
$LNRANGE2_{it}$	5.22	7.52	7.92	7.86	8.26	9.44	0.58
$LNRANGE3_{it}$	5.31	7.23	7.57	7.56	7.92	9.13	0.54
$LNRANGE4_{it}$	3.83	6.46	6.93	6.85	7.27	9.10	0.67
$PROFIT\_MARGIN_{it}$	-83.40	1.20	5.60	5.47	10.50	38.90	11.03
ROA_{it}	-40.60	2.60	8.80	9.84	15.40	62.90	11.64
$LNSALE_{it}$	7.79	10.38	11.16	11.24	11.94	17.29	1.31
$EQRATIO_{it}$	0.20	30.00	47.10	46.23	61.40	95.80	21.29
$SALES\_GROWTH_{it}$	-0.60	-0.03	0.05	0.09	0.14	2.55	0.27

Notes:
The table reports descriptive statistics of the sample. The variable definition is presented in Appendix 1. The number of observations is 879,095 in Panel A and 1,305 in Panel B.

Table 3 reports correlations among the variables used in the firm-level regression analysis.[6] The correlations of pay dispersion measures with $PROFIT\_MARGIN_{it}$ and ROA_{it} are negative and generally statistically significant for jobs characterized by complex tasks (Levels 1-3). Notably, correlations between pay disparity measures at Level 4 ($STD\_SALARY4_{it}$, $VARIANCE\_RATIO4_{it}$

6 For presentational convenience, we do not include variables $STD\_RES\_SALARY1_{it}$ – $STD\_RES\_SALARY4_{it}$ into the correlation matrix. We note that their correlation coefficients are very similar to the correlation coefficients on $STD\_SALARY1_{it}$ – $STD\_SALARY4_{it}$.

and $LNRANGE4_{it}$) and profitability measures are insignificant. The measures of pay dispersion at each of the four organizational levels are positively correlated with each other, however, their correlation coefficients are less than perfect, implying that multicollinearity should not be a problem when these variables are included simultaneously into a regression model. For example, out of Pearson correlations among $STD\_SALARY1_{it}$ – $STD\_SALARY4_{it}$, the strongest is 0.44 between $STD\_SALARY2_{it}$ and $STD\_SALARY3_{it}$. Further, the measures of pay dispersions are positively correlated with firm size, necessitating controlling for the firm-size effect in the multivariate setting. Finally, firm size exhibits a positive correlation with the performance measures, consistent with Ikäheimo et al. (2018).

Table 2 Sample distribution by job complexity level and employee level of education

	FREQUENCY	%
Panel A: COMPLEXITY level		
Level 1 (Non-executive managers)	63,154	7.18
Level 2 (Senior experts)	259,565	29.53
Level 3 (Experts)	390,441	44.41
Level 4 (Clerks)	165,935	18.88
	879,095	100.00
Panel B: EDUCATION level		
Level 3 (Secondary education)	178,179	20.27
Level 5 (Short-cycle tertiary education)	230,896	26.27
Level 6 (Bachelor or equivalent)	222,862	25.35
Level 7 (Master or equivalent)	166,651	18.96
Level 8 (Doctoral or equivalent)	10,670	1.21
Level 9 (Unknown)	69,837	7.94
	879,095	100.00

Notes:
The table reports the distribution of the employee-level sample by the employees' job complexity and education levels.

4.2 Regression analysis

As the first step, we present and discuss the results of estimating Eq. (2), which is necessary to compute $STD\_RES\_SALARY1_{it}$ –$STD\_RES\_SALARY4_{it}$. The results of estimating Eq. (2) are presented in Table 4.

When estimating this regression model, we use education level 9 (Unknown) as a reference

Table 3 Correlations among variables used in the firm-level empirical analysis

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	STD_SALARY1it		0.39	0.37	0.31	0.91	0.28	0.31	0.24	0.80	0.35	0.34	0.26	-0.06	-0.04	0.09	0.21	-0.02	-0.01
2	STD_SALARY2it	0.40		0.44	0.25	0.28	0.89	0.41	0.24	0.36	0.79	0.48	0.36	-0.04	-0.05	0.03	0.31	0.03	-0.05
3	STD_SALARY3it	0.37	0.48		0.37	0.26	0.27	0.93	0.35	0.31	0.33	0.75	0.39	-0.08	-0.05	0.17	0.18	-0.01	-0.01
4	STD_SALARY4it	0.27	0.34	0.43		0.24	0.14	0.29	0.92	0.20	0.20	0.26	0.64	-0.03	-0.01	0.12	0.10	-0.04	0.02
5	VARIANCE_RATIO1it	0.92	0.29	0.26	0.18		0.28	0.26	0.19	0.79	0.25	0.26	0.19	-0.06	-0.06	0.01	0.14	-0.04	0.00
6	VARIANCE_RATIO2it	0.29	0.90	0.32	0.20	0.27		0.33	0.16	0.29	0.73	0.34	0.21	-0.03	-0.07	-0.06	0.24	0.02	-0.07
7	VARIANCE_RATIO3it	0.31	0.42	0.94	0.32	0.26	0.34		0.32	0.29	0.31	0.76	0.32	-0.07	-0.06	0.09	0.16	0.02	-0.02
8	VARIANCE_RATIO4it	0.21	0.27	0.37	0.96	0.16	0.19	0.32		0.19	0.20	0.26	0.74	-0.02	-0.02	0.07	0.09	-0.02	0.02
9	LNRANGE1it	0.89	0.38	0.36	0.28	0.84	0.30	0.31	0.22		0.50	0.46	0.35	-0.03	-0.02	0.09	0.45	-0.04	0.00
10	LNRANGE2it	0.41	0.81	0.42	0.32	0.30	0.73	0.37	0.26	0.53		0.58	0.45	0.01	0.01	0.11	0.60	-0.02	-0.03
11	LNRANGE3it	0.37	0.49	0.82	0.37	0.27	0.36	0.78	0.32	0.47	0.61		0.47	-0.01	-0.01	0.14	0.53	0.01	0.03
12	LNRANGE4it	0.30	0.39	0.43	0.83	0.21	0.25	0.34	0.80	0.39	0.48	0.50		0.00	0.01	0.14	0.40	0.00	0.02
13	PROFIT_MARGINit	-0.06	-0.03	-0.07	-0.02	-0.07	-0.05	-0.08	-0.02	-0.04	0.02	0.00	0.02		0.66	-0.04	0.20	0.25	0.07
14	ROAit	-0.04	-0.06	-0.04	0.00	-0.06	-0.08	-0.05	0.00	-0.02	0.00	0.01	0.00	0.82		0.05	0.13	0.21	0.08
15	WCE_PERCit	0.09	0.04	0.16	0.07	0.02	-0.04	0.11	0.04	0.11	0.14	0.13	0.16	0.05	0.05		-0.08	0.02	-0.01
16	LNSALEit	0.25	0.34	0.22	0.15	0.17	0.28	0.20	0.12	0.46	0.61	0.51	0.39	0.15	0.12	-0.08		-0.02	0.08
17	EQRATIOit	-0.03	0.02	0.02	-0.02	-0.05	0.00	0.03	0.00	-0.04	-0.02	0.00	-0.01	0.32	0.24	0.03	-0.05		-0.10
18	SALES_GROWTHit	0.03	-0.02	0.00	0.06	0.01	-0.06	-0.03	0.02	0.02	0.01	0.03	0.05	0.17	0.22	0.03	0.08	-0.07	

Notes:
The table reports correlations among variables used in the firm-level empirical analysis. Pearson (Spearman) correlations appear above (below) the main diagonal. Correlations with absolute value greater than 0.05 are significant at the 0.01 level. The variable definition is presented in Appendix 1. The number of observations is 1,305.

Table 4 Employee-level determinants of WCE fixed salaries

	DEPENDENT VARIABLE = $SALARY_{JT}$
Intercept	1117.253***
	(21.93)
$EDUCATION_{jt}$ (Level =3)	-34.384
	(-0.71)
$EDUCATION_{jt}$ (Level = 5)	66.670
	(1.06)
$EDUCATION_{jt}$ (Level =6)	276.657***
	(3.43)
$EDUCATION_{jt}$ (Level =7)	714.749***
	(4.92)
$EDUCATION_{jt}$ (Level =8)	917.036***
	(5.49)
$COMPLEXITY_{jt}$ (Level =1)	2251.147***
	(11.52)
$COMPLEXITY_{jt}$ (Level =2)	1093.911***
	(17.37)
$COMPLEXITY_{jt}$ (Level =3)	354.429***
	(18.65)
$TENURE_{jt}$	-5.658***
	(-4.52)
$GENDER_{jt}$	338.608***
	(13.79)
AGE_{jt}	22.411***
	(31.26)
$CAPITAL_{jt}$	319.065***
	(15.54)
Industry and year fixed effects	YES
N	879,095
Adj. R^2	64.8%

Notes:
The table reports the results of estimating Eq. (2). All of the variables are defined in Appendix 1. The numbers in parentheses are t-statistics. Standard errors are clustered at the firm level. Coefficient estimates on industry and year-fixed effects are suppressed. ***, **, and * denote significance levels of 1%, 5%, and 10%, respectively.

category for the $EDUCATION_{jt}$ indicator variable, and complexity level 4 (Clerks) as a reference category for the $COMPLEXITY_{jt}$ indicator variable. The coefficient estimates from this regression are generally consistent with predictions. For example, there are no pay differentials for employees with the education levels 3 or 5 relative to the education level 9, suggesting that a lack of education is the most plausible reason for leaving the education field blank. The level of pay, however, increases gradually across education levels 6 to 8 (relative to level 9), meaning that more educated employees receive higher salaries. In a similar vein, employees facing the highest level of job complexity (non-executive managers) receive significantly higher pay relative to employees with the lowest level of job complexity (clerks). Male employees, employees of companies located in the Helsinki region, and older employees receive higher salaries. Unexpectedly, the coefficient on $TENURE_{jt}$ is negative, implying that employees who have been employed longer, receive lower pay. However, in interpreting this coefficient, it is important to consider that we control for employee age. Posited differently, for employees of the same age, those with shorter tenure receive a higher salary. When we re-estimate Eq. (2) without controlling for AGE_{jt}, the coefficient on $TENURE_{jt}$ is positive and significant, as expected. Finally, the adjusted *R*-squared from this regression is 64.8%, suggesting that the independent variables explain the majority of variation in the fixed salary.

Table 5 reports the results of estimating Eq. (1). Columns (1)-(4) and (5)-(8) show the results of the estimations with ROA_{it}, and $PROFIT\_MARGIN_{it}$ used as a dependent variable, respectively.

Table 5 OLS regression analysis: WCE horizontal pay dispersion and firm profitability

	DEPENDENT VARIABLE =							
	ROA_{it}				$PROFIT\_MARGIN_{it}$			
	(1) *DISPARITY= STD_SALARY*	(2) *DISPARITY= STD_RES_ SALARY*	(3) *DISPARITY= VARIANCE _RATIO*	(4) *DISPARITY= LNRANGE*	(5) *DISPARITY= STD_SALARY*	(6) *DISPARITY= STD_RES _SALARY*	(7) *DISPARITY= VARIANCE _RATIO*	(8) *DISPARITY= LNRANGE*
$DISPARITY1_{it}$	-0.001	-0.001	-3.077	-1.015	-0.001	-0.001	-3.305	-0.979
	(-1.03)	(-1.26)	(-0.63)	(-1.57)	(-0.83)	(-0.89)	(-0.68)	(-1.38)
$DISPARITY2_{it}$	-0.003*	-0.004*	-11.421*	-0.841	-0.003*	-0.003	-6.077	-1.259
	(-1.71)	(-1.84)	(-1.74)	(-0.90)	(-1.76)	(-1.60)	(-0.98)	(-1.51)
$DISPARITY3_{it}$	-0.005*	-0.006*	-19.006**	-2.148*	-0.005*	-0.006**	-17.482**	-2.182**
	(-1.83)	(-1.88)	(-2.34)	(-1.92)	(-1.91)	(-2.08)	(-2.10)	(-2.25)
$DISPARITY4_{it}$	0.000	0.001	-1.999	-0.838	0.002	0.002	1.875	-0.622
	(0.26)	(0.63)	(-0.30)	(-1.25)	(1.04)	(0.90)	(0.33)	(-0.96)
WCE_PERC_{it}	4.048	4.278*	3.679	5.347**	-3.100	-2.906	-3.548	-1.556
	(1.63)	(1.70)	(1.48)	(2.10)	(-1.16)	(-1.10)	(-1.33)	(-0.61)
$LNSALE_{it}$	1.892***	1.876***	1.835***	2.695***	2.402***	2.351***	2.257***	3.273***
	(5.55)	(5.50)	(5.60)	(5.83)	(4.94)	(4.95)	(4.87)	(5.07)
$EQRATIO_{it}$	0.111***	0.112***	0.111***	0.111***	0.128***	0.129***	0.127***	0.127***
	(5.31)	(5.42)	(5.30)	(5.28)	(5.92)	(6.03)	(5.89)	(5.87)
$SALES\_GROWTH_{it}$	3.346***	3.383***	3.391***	3.335***	2.330**	2.409**	2.470**	2.285**
	(2.77)	(2.81)	(2.83)	(2.83)	(2.18)	(2.26)	(2.36)	(2.21)
Industry and year fixed effects	YES	YES	YES	YES	YES	YES	YES	YES
N	1,305	1,305	1,305	1,305	1,305	1,305	1,305	1,305
Adj. R^2	13.4%	13.7%	13.5%	13.9%	15.5%	15.4%	14.9%	16.1%

Notes:
The table reports the results of estimating Eq. (1). All of the variables are defined in Appendix 1. The numbers in parentheses are t-statistics. Standard errors are clustered at the firm level. Coefficient estimates on intercept, industry and year fixed effects are suppressed.
***, **, and * denote significance levels of 1%, 5%, and 10%, respectively.

The regression coefficients across the specifications generally show a significantly negative relation between WCE pay disparity at Level 2 and Level 3 and the accounting measures of profitability, after controlling for economic determinants of firm performance. In terms of economic significance, the coefficient of -0.005 on $DISPARITY3_{it}$ in column (1), for example, indicates that a one standard deviation increase in $DISPARITY3_{it}$ is associated with a 0.953 (9.7%) decrease in ROA_{it} when evaluated at the mean. Furthermore, the relation between $DISPARITY4_{it}$ and firm performance is insignificant across all of the eight specifications, also consistent with our prediction that horizontal pay dispersion does not impair the motivation of employees whose work entails relatively simpler tasks.

The results in Table 5 also indicate that the relation between the pay disparity measures of employees at Level 1, who are also faced with presumably complex tasks, and firm performance measures, are insignificant as well, contrary to our prediction. This pattern may result from relatively high correlations among the pay disparity measures, whereby the strongest effect subsumes the predictive ability of the other variables. To test for this possibility, we re-estimate specifications (1) and (5) of Table 5 with the pay disparity measures included one at a time. The untabulated results indicate that the pay disparity at Level 1 exhibits a significantly negative relationship with both ROA_{it} and $PROFIT\_MARGIN_{it}$, whereas the pay disparity variable of Level 4 is insignificant in both specifications. Moreover, coefficient estimates on pay disparity measures at Levels 2 and 3 are statistically significant, similarly to the results presented in Table 5. Taken together, the results of this analysis suggest that, when considered in isolation, pay disparity measures at organizational levels characterized by complex tasks (Levels 1, 2, and 3) are significantly negatively associated with firm performance, whereas pay disparity measures of employees engaged in relatively simple tasks (Level 4) are not.

Finally, we test whether our primary results are robust to the inclusion of firm-fixed effects. Table 6 presents the results of estimating Eq. (1) with firm-fixed effects in place of industry-fixed effects.

Table 6 Firm fixed effects regression analysis: WCE horizontal pay dispersion and firm profitability

	DEPENDENT VARIABLE =							
	ROA_{it}				$PROFIT\_MARGIN_{it}$			
	(1) *DISPARITY= STD_SALARY*	(2) *DISPARITY= STD_RES_ SALARY*	(3) *DISPARITY= VARIANCE _RATIO*	(4) *DISPARITY= LNRANGE*	(5) *DISPARITY= STD_SALARY*	(6) *DISPARITY= STD_RES _SALARY*	(7) *DISPARITY= VARIANCE _RATIO*	(8) *DISPARITY= LNRANGE*
$DISPARITY1_{it}$	0.001	0.001	5.327	0.082	0.000	0.000	0.607	-0.116
	(1.15)	(1.02)	(1.08)	(0.13)	(0.35)	(0.41)	(0.15)	(-0.19)
$DISPARITY2_{it}$	-0.001	-0.002	-1.350	-1.248	-0.002*	-0.003**	-6.500	-1.439**
	(-0.45)	(-1.51)	(-0.22)	(-1.37)	(-1.78)	(-2.35)	(-1.35)	(-2.03)
$DISPARITY3_{it}$	-0.005**	-0.003	-18.173**	-2.694**	-0.001	0.000	-5.718	-1.201
	(-2.41)	(-1.24)	(-2.24)	(-2.29)	(-0.50)	(0.18)	(-0.76)	(-1.29)
$DISPARITY4_{it}$	0.003	0.002	10.434*	0.358	0.002	0.002	5.831	-0.149
	(1.42)	(1.04)	(1.77)	(0.47)	(1.33)	(1.05)	(1.16)	(-0.25)
WCE_PERC_{it}	0.957	0.924	1.173	3.256	0.890	0.716	1.247	2.771
	(0.27)	(0.26)	(0.33)	(0.89)	(0.28)	(0.22)	(0.38)	(0.81)
$LNSALE_{it}$	6.996***	7.003***	7.001***	7.597***	6.953***	6.958***	6.979***	7.524***
	(4.24)	(4.16)	(4.19)	(4.29)	(4.40)	(4.43)	(4.41)	(4.47)
$EQRATIO_{it}$	0.252***	0.251***	0.253***	0.246***	0.136***	0.135***	0.136***	0.133***
	(6.47)	(6.40)	(6.48)	(6.33)	(4.35)	(4.32)	(4.35)	(4.27)
$SALES\_GROWTH_{it}$	4.364***	4.282***	4.335***	4.291***	2.783**	2.717**	2.771**	2.743**
	(3.47)	(3.41)	(3.43)	(3.48)	(2.53)	(2.46)	(2.52)	(2.51)
Firm and year fixed effects	YES	YES	YES	YES	YES	YES	YES	YES
N	1,305	1,305	1,305	1,305	1,305	1,305	1,305	1,305
Adj. R^2	67.5%	67.3%	67.5%	67.4%	72.8%	72.8%	72.7%	72.8%

Notes:
The table reports the results of estimating Eq. (1) using firm-fixed effects. All of the variables are defined in Appendix 1. The numbers in parentheses are t-statistics. Coefficient estimates on intercept, industry and firm fixed effects are suppressed. ***, **, and * denote significance levels of 1%, 5%, and 10%, respectively.

The results reported in Table 6 show significantly negative coefficients on either Level 2 or Level 3 pay disparity measures in six out of eight specifications, and thereby suggest that our primary results are unlikely to be driven by the omitted variable bias.

4.3 Additional analysis and robustness tests

To assess the robustness of our results, we perform several additional analyses.

First, we perform a 'placebo test' by estimating Eq. (1) using pay disparity measures calculated using total pay instead of fixed pay. In addition to fixed pay, total pay includes bonuses and perquisites. Since the amount of bonuses is usually determined based on pre-set performance targets and, as such is less subjective relative to the fixed pay component, we expect to find a weaker relation between the pay disparity measure calculated in this way and the measures of accounting performance. The untabulated results indicate that neither of the measures of total pay dispersion are statistically significant at conventional levels in regressions with either ROA_{it} or $PROFIT\_MARGIN_{it}$ used as a dependent variable. Taken together, the results of this test suggest that considering non-fixed compensation components in computing the pay disparity measures weakens the relationship between pay disparity and firm performance and that the effect we document is concentrated within pay dispersion of the fixed component of total compensation.

Second, we test the sensitivity of our results to the exclusion of the smallest firms. In the main regression analysis, we form our sample by requiring at least three employees at each of the task complexity level. However, standard deviation estimates based on a few observations may be inaccurate. We, therefore, replicate our tests using a sample, in which we require at least five employees to be employed at each of the task complexity level. Table (7) reports the results of re-estimating specifications reported in columns (1) – (3) of Table 5 and columns (1) – (3) of Table (6) using this more restrictive sample.

Table 7 Sensitivity of the results to the exclusion of the smallest firms

	DEPENDENT VARIABLE = ROA_{IT}					
	(1) DISPARITY= STD_SALARY	(2) DISPARITY= STD_RES_ SALARY	(3) DISPARITY= VARIANCE _RATIO	(4) DISPARITY= STD_SALARY	(5) DISPARITY= STD_RES _SALARY	(6) DISPARITY= VARIANCE _RATIO
$DISPARITY1_{it}$	0.000	-0.001	2.984	0.002	0.002	9.272
	(-0.33)	(-0.42)	(0.40)	(1.15)	(0.94)	(1.25)
$DISPARITY2_{it}$	-0.005**	-0.005*	-15.555*	-0.002	-0.004**	-7.049
	(-2.13)	(-1.89)	(-1.78)	(-1.07)	(-2.13)	(-0.87)
$DISPARITY3_{it}$	-0.008***	-0.010***	-29.664***	-0.007***	-0.003	-18.369**
	(-2.94)	(-3.02)	(-2.99)	(-2.81)	(-1.11)	(-2.01)
$DISPARITY4_{it}$	0.007	0.008	10.687	0.005	0.004	9.224
	(1.50)	(1.40)	(1.06)	(1.32)	(0.85)	(1.03)
WCE_PERC_{it}	3.967	4.328	3.497	-0.977	-1.251	-0.769
	(1.31)	(1.44)	(1.17)	(-0.21)	(-0.27)	(-0.17)
$LNSALE_{it}$	1.917***	1.855***	1.832***	7.940***	7.981***	8.043***
	(5.04)	(4.81)	(4.85)	(3.44)	(3.36)	(3.46)
$EQRATIO_{it}$	0.121***	0.120***	0.120***	0.231***	0.230***	0.231***
	(4.70)	(4.63)	(4.64)	(4.71)	(4.65)	(4.72)
$SALES\_GROWTH_{it}$	5.378***	5.467***	5.629***	4.724**	4.734**	4.711**
	(3.05)	(3.12)	(3.16)	(2.15)	(2.15)	(2.13)
Year fixed effects	YES	YES	YES	YES	YES	YES
Industry fixed effects	YES	YES	YES	NO	NO	NO
Firm fixed effects	NO	NO	NO	YES	YES	YES
N	867	867	867	867	867	867
Adj. R^2	18.3%	18.6%	18.1%	67.0%	66.9%	66.9%

Notes:
The table reports the results of estimating Eq. (1) after exclusion of firm-year observations with less than five employees at the each complexity level. All of the variables are defined in Appendix 1. The numbers in parentheses are t-statistics. Standard errors are clustered at the firm level in the specifications with industry fixed effects. Coefficient estimates on intercept, industry, year and firm fixed effects are suppressed. ***, **, and * denote significance levels of 1%, 5%, and 10%, respectively.

The sign and statistical significance of the coefficients reported in Table 7 are similar to the ones we documented in the main analysis. Specifically, pay dispersion measures in the groups of experts and senior experts exhibit significantly negative associations with the accounting profitability. Moreover, when compared to the estimates reported in Tables 5 and 6, the coefficients on $DISPARITY3_{it}$ and $DISPARITY2_{it}$ are more pronounced and more significant, consistent with the smallest firms biasing the measures of pay dispersion.

Third, we re-estimate Eq. (1) using alternative measures of firm performance, such as Return on capital employed and labor productivity measured as a natural logarithm of sales per employee (e.g., Faleye, Mehrotra, & Morck, 2006; Sengupta & Yoon, 2018) and continue to find regression coefficients similar in sign and significance to the ones reported in Tables 5 and 6.

Fourth, in untabulated tests, we continue to document significantly negative relations between expert-level WCE pay disparity and firm performance in the majority of specifications when we use one-year-ahead instead of concurrent measures of accounting performance. We perform this test in order to address a potential reverse causality between the dependent and independent variables. We, however, note that because fixed salaries are typically set at the beginning of the performance period, investigating the concurrent relation between WCE pay disparity and firm performance takes into account the possibility of lead-lag relations. Moreover, because we focus on the pay dispersion of fixed salaries rather than performance-based salaries, the channel through which reverse causality may affect the relationship we examine is not immediately evident.[7]

5. Conclusions

In this study, we examine the moderating role of task complexity in the relation between WCE horizontal pay dispersion and firm performance in a sample of Finnish manufacturing companies. Using accounting profitability as a measure of firm performance, we document that a significantly negative relation between WCE pay dispersion and firm performance is attributed to the groups of employees facing more complex tasks. Specifically, the relation is driven by the pay dispersion of employees engaged in expert and senior expert tasks. In contrast, the relation between the pay dispersion of employees involved in the most routine tasks and firm performance is insignificant. Taken together, these results indicate that task complexity plays a role in employees' perceptions of horizontal pay disparities as is subsequently revealed in the levels of organizational performance.

Our study has implications for practitioners. Specifically, the results of our study suggest that there are performance benefits of compressed pay structures in the groups of employees facing complex knowledge-based expert tasks. Human resource professionals could consider this in developing compensation practices.

Future studies could identify and examine other characteristics of employees or their job profiles, which moderate the relation between pay dispersion and organizational performance and, in general, explain the balance between the tournament theory and the fair-wage hypothesis. For example, the prediction of the positive relationship between employee pay disparity and organizational performance of the tournament theory builds on the assumption of a possibility and willingness of employees to be promoted to higher ranks. However, not all of the individuals may be motivated by promotions to the same extent. One avenue for future

7 Lallemand et al. (2004), for example, argue that better-performing firms may pay larger bonuses. Because we compute the WCE pay disparity measures using fixed compensation, which is insensitive to current performance, this argument does not apply to our setting.

research is, thus, to identify personal traits that are associated with employees' responsiveness to promotional incentives and examine whether those traits moderate the relation between employee pay disparity and organizational outcomes.

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Appendix 1. Variable definitions

VARIABLE	DEFINITION
WHITE_COLLAR EMPLOYEES	The number of employees per firm-year for whom the salary information is available in the EK survey.
WCE_PERC	The number of employees per firm-year for whom the salary information is available in the EK survey divided by the total number of employees reported in the Voitto+ database.
MEAN_SALARY	The average fixed monthly salary of white-collar employees per firm-year.
STD_SALARY1- STD_SALARY4	The standard deviation of the fixed monthly salary calculated at the firm, year and job complexity level.
STD_RES_SALARY1- STD_ RES_SALARY4	The standard deviation of the residual fixed monthly salary calculated at the firm, year and job complexity level. The residual fixed monthly salary is calculated from a regression of the fixed monthly salary on the employee's education level *(EDUCATION*), tenure (*TENURE*), job complexity level (*COMPLEXITY*), gender (*GENDER*), age (*AGE*) and an indicator variable for the Helsinki metropolitan region (*CAPITAL*).
VARIANCE_RATIO1- VARIANCE_ RATIO4	The standard deviation of the fixed monthly salary calculated at the firm, year and job complexity level divided by average fixed monthly salary at the firm, year and job complexity level.
LNRANGE1- LNRANGE4	Natural logarithm of the difference between the maximum and minimum level of fixed salary per firm-year-complexity level.
DISPARITY1-DISPARITY4	General name of pay disparity measures (*STD_SALARY1- STD_SALARY4, STD_RES_SALARY1- STD_RES_SALARY4, VARIANCE_RATIO1- VARIANCE_RATIO4* or *LNRANGE1- LNRANGE4).*
PROFIT_MARGIN	Net income divided by sales, multiplied by 100.
ROA	The ratio of income before interest and special items to total assets, multiplied by 100.
LNSALE	The natural logarithm of sales.
EQRATIO	The equity-to-total assets ratio.
SALES_GROWTH	The annual percentage sales growth.
SALARY	The fixed monthly salary of a white-collar employee.
EDUCATION	Level of education according to the definition of Bureau of Statistics Finland.
TENURE	Number of years the employee is employed by the company.
COMPLEXITY	Employee job complexity taking values from 1 to 4 (non-executive managers, senior experts, experts, clerks). Level 1 indicates the most demanding tasks (non-executive managers) and Level 4 indicates the least demanding routine tasks (clerical tasks).
GENDER	Indicator variable taking a value of one for male employees, and zero for females.
AGE	Employee's age.
CAPITAL	An indicator variable taking a value of one if a company is located in the Helsinki region; zero otherwise.