Human resource practices, employee overtime, and work uncertainty.

Is overtime wasted time?

Argyro Avgoustaki
Universidad Carlos III de Madrid, Department of Business Administration
Calle Madrid 126, 28903 Madrid, Spain
e-mail: argyro@emp.uc3m.es

Abstract: Using data from the European Working Conditions Survey, the paper tests how human resource practices, both individually and as interrelated elements in a consistent human resource bundle, are associated with employee overtime as an indicator of work intensification. It further examines the strength of these relationships when combined with uncertainty at work, along with the subsequent association between work intensification, and employee health stress, and satisfaction. Support is found for the hypothesis suggesting that the adoption of specific practices is positively related to work intensification, and for the hypothesis predicting that work intensification is positively associated with employee health stress and negatively associated with employee satisfaction. However, estimates partly support the interaction hypothesis and weakly the complementarity hypothesis of human resource practices.

Key words: human resource practices, overtime, work uncertainty, work intensification.

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1 Introduction

Several studies have demonstrated that human resource practices including participatory mechanisms, skill-based rewards, rotation schemes, or training systems positively affect labor productivity (Arthur 1994; Koch and McGrath 1996; Ichniowski, Shaw, and Prennushi 1997), financial performance (Huselid 1995; Huselid, Jackson, and Schuler 1997), or employee retention (Guthrie 2001). As it appears, the adoption of such practices is related to various positive outcomes through process improvements (MacDuffie 1995), higher employee involvement in the firm (Guthrie 2001), or higher employee effort (Green 2004). Despite the consensus from scholars that the adoption of these practices could yield positive results, substantial uncertainty still remains as to whether the proposed benefits come to employee at the expense of work intensification (Ramsay 2000). The main premise of this perspective suggests that the adoption of human resource practices could simply imply excessive workload or excessive working hours given that employee involvement in the firm or employee responsibilities are higher. This is in accordance with conceptual arguments stating that managers are driven constantly to find ways to make employees work longer and/or harder as a means to maximize labor input, and the rising work intensity figures reported in the last years (Green and McIntosh 2001; Green 2004).

The study draws on this alternative perspective which focuses on how human resource practices are related to work intensification in the form of employee overtime and this idea is mainly standing at the crossroad of three streams of literature; the human resource management, the employee overtime, and the work intensification. Papers on the former literature focus on the impact of human resource practices on different performance outcomes, however, the majority of them do not have sufficient data to account for possible changes in employee working time resulted from the introduction of such practices. Papers on the overtime literature identify key drivers of overtime by looking mainly at wages, unionization, employee absenteeism, or differences in employee skills. However, human resource practices could be also associated with the overtime incidence, yet they are ignored. Finally, papers on the work intensification stream of literature identify that human resource practices are important sources of work intensification, which may has manifested itself either by longer hours spent at work or by exerting greater work effort during a given period of time (Ramsay 2000; Green 2004), nevertheless, focus almost exclusively on the subjective nature of the effort-intensification data, e.g. change in labor productivity measured on a scale from 1, gone down a lot to 5, gone up a lot (Ramsay 2000; Green 2004), and do not take into account altered working time. Thus, suggesting that existing findings await confirmation stemming from studies employing datasets of different and more objective measures of

effort changes.

Given the importance of changes in working hours as a component of employee performance and work intensification, I assert the value of extending research pertaining to all three streams of literature by estimating an empirical model of the link between human resource practices, and employee overtime as an indicator of work intensification. Drawing on the 2005 European Working Conditions Survey (EWCS), I explore the relationships between individual and interrelated practices in a consistent human resource bundle, and employee overtime. Further, I examine how the strength of these relationships is influenced by a moderator variable, the uncertainty at work. As an ultimate objective, this study tries to clarify whether employee overtime is time spent wisely or not. One way to study this issue is by examining the effect of overtime on productivity; though, the survey used for the purposes of the study does not provide any direct measure neither of employee productivity nor of performance. Instead, it provides one measure of employee health stress and one of employee satisfaction, which could provide complementary evidence on the overtime results, and help to observe whether overtime adds any value or if it is more likely to be wasted time, inferring that employee stress is more likely to be the outcome of increased work effort.

The survey aims to provide an analysis of working conditions of nearly 30,000 individual workers in thirty one European countries. European Union is an important context to study this relationship since many European firms have begun to transform their traditional practices, namely from narrow job assignments and inflexible work rules to more innovative ones such as teamwork, job rotation, incentive pay, information sharing, and training (Ichniowski, Shaw, and Prennushi 1997). While the dataset is cross-sectional without regard to differences in time, its design provides a very clear picture of the working conditions in Europe as perceived by the job holders, and helps to identify how human resource practices are associated with employee overtime.

2 Previous research

The literatures on human resource management, employee overtime, and work intensification are all relevant into extending the main arguments of this paper.

Indicatively, in the human resource management literature, Huselid (1995) examines the link between human resource practices and intermediate employee outcomes such as employee turnover, pro-

ductivity, and short-term and long-term measures of corporate financial performance. He measures turnover with the average annual rate of turnover, firm productivity with the logarithm of sales per employee, and financial performance with the logarithm of Tobin's q, and the gross rate of return on capital. Koch and McGrath (1996) study the effects of human resource planning, recruitment, and selection strategies on labor productivity. In this case, productivity is measured by dividing the business unit's net sales by the number of employees, thus comparing the input of labor to the output of sales. Black and Lynch (1996) examine the impact of human capital investments, including age and certain types of employer-provided training, on business productivity proxied by the dollar value of sales. Black and Lynch (2001) show how workplace practices, and information technology affect productivity levels measured by the sales per production worker. Guthrie (2001) tests how the use of such practices impacts both employee retention and firm productivity. Labor productivity is the logarithm of sales per employee, and employee retention is measured as the firm's average annual rate of employee turnover. There are, however, few exceptions which indirectly take into consideration working time. Indicatively, the studies of Ichniowski, Shaw, and Prennushi (1997) and Ichniowski and Shaw (1999) investigate the productivity effects of various practices such as incentive pay, teams, and training, and measure productivity with uptime claiming that increases in uptime are increases in tonnage and productivity.

In the overtime literature, Ehrenberg (1970) argues that absenteeism is one of the causes that could increase the amount of overtime worked per employee. Bauer and Zimmermann (1999) suggest that the employee skill levels and output growth play an important role on overtime, whereas compensation for overtime has become less relevant. Doerr, Klastorin, and Magazine (2000) infer that overtime is of significance when manufacturing to a quota, and point out that when working times are highly variable, overtime is a better alternative than hiring additional workers. Finally, the paper by Kalwij, and Gregory (2005) suggests that a reduction in standard weekly hours increases overtime work, whereas an increase in the wage rate decreases the incidence of overtime, and union coverage appears to be of negligible importance.

Turning to the work intensification literature, Ramsay (2000) studies the relationship of an inclusive set of twenty four human resource practices (e.g. performance related pay, training, recruitment and selection, teamwork), and a number of performance outcomes including the intensification at work. However, his measure of work intensification is based on subjective management reports of change in labor productivity and none of them considers the impact on employee working time. His findings

suggest that in work environments where these practices have been applied, management does perceive higher levels of productivity. Green (2004) also hypothesizes that work intensification has been stimulated, among others, by the implementation of human resource practices. Again, work intensification is measured through subjective reports on a survey question about changes in workplace regarding how hard people work at their job. What he reports explains that both employee involvement schemes and effort incentives appear to engender greater effort. Other studies attribute work intensification to the decline of trade union density, the introduction of new technologies and in particular computerization, and the increased competitive pressures on firms (Green and McIntosh 2001; Burchell, Lapido, and Wilkinson 2002), as well as when reliance on temporary workers is high (Green 2001, 2004), or when employees work on complex jobs or long work schedules (Maume, and Purcell 2007).

3 Theoretical framework

Conceptually human resource practices can be classified in terms of their impact on employee skills, motivation, and the way the work is structured (Huselid 1995; Delaney and Huselid 1996). I use a set of human resource practices pertaining to each category and I explain how each of them can be associated with employee overtime. I further explain why when there are complementarities among these practices, there could be a positive association with employee overtime as well. Then, I introduce work uncertainty as a moderator of the relationship between human resource practices and overtime hypothesizing that human resource practices may be more strongly associated with overtime under conditions of high work uncertainty compared to conditions of low uncertainty. Finally, I assess that work intensification could produce greater employee stress when workers put more effort or do a work related task during that extra time, and counter intuitively less satisfaction. Below, I unfold the reasoning behind each hypothesis.

Previous scholars affirm that among the human resource practices, training is considered a very powerful mechanism to improve the quality of current employees and elicit desired behavior. In particular, the provision of training may engender a productivity enhancing response from the employee (Rousseau 1995) who may see his/her knowledge and employability to be improved by this practice and reacts by exerting more effort. In consequence, firms investing in employee training may enjoy the rewards of improving employees' skills and effort levels, which will eventually lead to increased

efficiencies in processes and firm productivity. Similar to training, job rotation schemes can have a number of positive implications on employees' performance. Rotated employees gain work experience (London and Stumpf 1982; Gutteridge 1986; Campion, Cheraskin, and Steves 1994), skills (Ortega 2001), and develop abilities that can be useful in meeting production needs in case of reallocation across different tasks or in moving up to higher positions (Eriksson and Ortega 2006). However, one could argue that the implementation of training schemes could boost employee overtime due to the time employees have to spend in learning. Similarly, the benefits attributed to rotation schemes come with costs which include increased workload levels (Campion, Cheraskin, and Steves 1994) or delays due to the adaptability needs in each rotated position in which employees might need more time to perform new assignments or adjust to job requirements.

The effect of these practices might be constrained if employees lack motivation to perform their job (Huselid 1995; Delaney and Huselid 1996). Another element of human resources management practices is the use of economic incentives, whereby performance-related pay is linked to productivity (Green 2004). Several studies have focused on the importance of performance-related pay as a motivation tool, reporting substantial gains in productivity when workers are paid piece rate rather than fixed wages (Ichniowski, Shaw, and Prennushi 1997; Lazear 2000; Shearer 2004). As it appears, jobs with performance-related pay induce workers to exert greater effort because in return they expect their efforts to be rewarded (Ichniowski et al., 1997; Green and McIntosh 1998). Incentive pay seems also to be associated with longer hours at work (Bell and Freeman 2001), proposing that this mechanism could be a possible reason of work intensification if employees have to show higher effort and stay overtime at work.

Furthermore, how and what work is performed is closely related to the extent that skilled and motivated employees are involved in the workplace (Delaney and Huselid 1996). Forms of organization that have been suggested to be associated with a number of favorable outcomes include teamwork. Team implementation may expand production possibilities by using collaborative skills or information sharing that may aid in transferring idiosyncratic knowledge from one team member to another (Lazear 1998; Hamilton, Nickerson, and Owan 2003). Thus, one may well expect that team members might need less time to complete a task, resulting from complementarities in production among workers. Nevertheless, teams stand out as the most difficult practice to sustain (Osterman 2000) and it relates to the intergroup conflict or the free rider problem, the result of which is sometimes failure to reach expected outcomes (Hackman 1990), such as to deliver output on time or potential work done outside

normal hours in order to reach expected productivity levels.

Other practices such as the introduction of employee discretion mechanisms, including processes through which employees can organize their own work by choosing the methods and/or the scheduling of work, could bring a number of favorable outcomes as well (Osterman 1995; Ortega 2009). Employers mainly grant discretion in order to enhance individual knowledge and improve firm performance (Osterman 1995). Employees in response might be positively influenced by this participative regime and accomplish more in less time, since they presumably know their work better than anyone else (Bailey 1993) and can identify and solve problems prompter than managers who may lack knowledge on the specificities of each job. Nonetheless, employee discretion could also designate less assistance at work and more individual responsibility that could aggravate employee overtime. Taking these arguments into account, then it is expected:

Hypothesis 1. Individual human resource practices affecting employee skills, motivation, and the structure of work will be positively associated with employee overtime.

Recent work has highlighted the role of complementarities among human resource practices and the importance to analyze practices not individually but as part of a coherent system (Milgrom and Roberts 1995; MacDuffie 1995). This perspective is based on the notion that some practices often complement each other, so that the adoption of one becomes more effective when applied in combination with one or more practices (Ichniowski and Shaw 1999). For example, introducing a sharing plan may have no effect on productivity unless it is linked to other practices that deal with the free rider problem associated with a corporate-wide profit sharing plan (Kandel and Lazear 1992). Or firms that wish to create an environment that decentralizes decision making and promotes the development of ideas from its workers might need to apply adequate training policies for giving employees the necessary skills to develop valuable ideas, but also an incentive pay plan aiming at fostering their participation (Milgrom and Roberts 1990, 1995). Thus, interrelated human resource practices can create multiple, mutually reinforcing conditions that support employee motivation, skill acquisition (MacDuffie 1995), and promote higher performance levels (Milgrom and Roberts 1995).

Although the interrelationship among human resource practices could imply a raise of overall performance, it could equally imply that employee work is becoming more intense. According to Arthur (1992) human resource systems are characterized by higher levels of employee involvement in managerial decisions, formal participation programs, and other practices. Similarly, according to Huselid (1995) a group of human resource practices promotes employee attachment and commitment. There-

fore, if firms want employees to be ready to solve problems promptly while participating continuously in decision making, or in the improvement of work activities, then employees might have to show more effort translated to extra working time as a result of higher involvement, added responsibility, and job demands. Accordingly:

Hypothesis 2. Complementary human resource practices affecting employee skills, motivation, and the structure of work will be positively associated with employee overtime.

Further, the human resource literature has pointed the capacity of human resource practices to facilitate a firm's ability to adapt effectively and in a timely manner to changing demands, from either the environment or from within the firm itself (Milliman, Von Glinow, and Nathan 1991; Snow and Snell 1993; MacDuffie 1995). According to that perspective, one of the important aspects of human resource practices infers that those employees introduced to one or various practices can become more flexible in the organization of work and thus, can better acclimatize to uncertain and dynamic environments. However, uncertainty at work could intensify the effect of these practices in an alternative way. Drawing upon the previous hypotheses, human resource practices could be positively related to work intensification, causing an excess of normal working hours, and in extension to that, introducing uncertainty at work might lead to a stronger association between these components. For instance, higher employee participation may signify a shift from inflexible tasks to employee involvement on decisions previously left to the discretion of management (Gittleman, Horrigan, and Joyce 1998). This shift in responsibility when the work environment is uncertain, instead of causing performance gains, could cause an even higher offloading of tasks leading to employee overtime. Accordingly:

Hypothesis 3. Work uncertainty will strengthen the positive relationship between human resource practices affecting employee skills, motivation, and the structure of work, and employee overtime.

Is overtime wasted time? Employee stress although is an undesirable potential outcome for the employee (McCormick and Cooper 1988; Burchell et al., 1999; Green and McIntosh 2001), on the other hand it can generate higher output. Stress is more likely to be the outcome of increased work effort and more employee involvement in the firm rather than the outcome of less effort. In fact, previous research has shown that self-reported effort levels are correlated with measures of work stress and measures of productivity (Green 2004). Therefore, it is reasonable to expect employee overtime to be positively related to employee stress when employees perform high effort or work related tasks

during overtime hours and a negative relationship to imply the contrary. Counter intuitively, it can be expected that employees who exert more effort by working overtime to be less satisfied than employees who are working less overtime. Accordingly:

Hypothesis 4. The more overtime an employee is working in the firm, the higher the likelihood to show stress at work, and the lower the likelihood to be satisfied.

4 Data and measures

The main source of data is the European Working Conditions Survey (EWCS) carried out in 2005 by the European Foundation for the Improvement of Living and Working Conditions. The survey is designed to present a detailed analysis of various aspects of working life across the European Union, the two candidate countries Turkey and Croatia, as well as Switzerland and Norway, and provides insights into emerging themes and specific practices applied. It is based on self-reports of nearly 30,000 individual workers, however, given that the paper studies human resource practices such as teamwork and rotation, self-employed individuals had to be excluded.

Unlike previous literature which has focused on subjective measures of work intensification, here it is elaborated a more objective measure as a dependent variable, defined as overtime. This is a count variable assessed using a question that asks how many times a month does an employee work more than 10 hours a day. For the majority of individuals this is zero, but for the remainder, values typically reach as many as thirty with some observations reaching thirty one.

The questionnaire contains very detailed information of specific human resource practices pertaining to employee skills, motivation, and structure of work, out of which seven main explanatory variables have been constructed; training, task rotation, productivity pay, gain sharing, teamwork, employee discretion over methods, and employee discretion over schedule. The two former variables refer to employee skills. Specifically, training is constructed out of four different types of training mentioned in the survey; training provided by the employer or by the employee if he/she is self-employed, training paid by the employee, on-the-job training, and other forms of on-site training and learning. The variable takes 1 in case of having received any of the four training activities and 0 otherwise. Task rotation is examined by using a dichotomous (yes/no) question that asks if an employee's job involves rotating tasks between himself/herself and colleagues. The next two variables, productivity pay and

gain sharing refer to employee motivation. Both are measured dichotomously with questions that ask whether employee remuneration includes payments based on the overall performance, and whether he/she receives productivity piece rate or productivity payments. Further, teamwork and the employee discretion variables refer to the structure of work. The former variable is measured dichotomously and depicts whether an employee's job involves doing all or part of his/her work in a team. Discretion over methods is based on three questions regarding employee autonomy to choose or change the order of tasks, the methods of work, and the speed or rate of work. The variable takes 1 in case of having autonomy in any of the three and 0 otherwise. In the same way is constructed the measure of discretion over schedule. In particular, three questions are used on employee autonomy to choose breaks, decide when to take holidays, and choose among different working time arrangements.

In order to calculate the bundle, I use the additive approach following MacDuffie (1995), which allows for a less restrictive bundling of human resource practices. MacDuffie (1995) suggests that the summation in the additive approach keeps normal distribution and it is a less rigid criterion for a bundle than the multiplicative approach, especially when a certain practice does not exist. Here, the constructed index captures whether employees are involved in any 5 out of the 7 individual human resource practices.

Work uncertainty can be expressed along different dimensions. For the purpose of this paper, focus has been given on task interruptions and changes on employee's schedule. The first item, defined as task uncertainty, measures how often does an employee have to interrupt a task he/she is doing in order to take on an unforeseen task, and is expressed at a 4-point scale (never, 0, to yes, very often, 3). The second item, defined as schedule uncertainty, measures whether changes in schedule occur regularly and if yes, how long before the employee is informed about the changes. Responses for this item have a 5-point response format (no, 0, to yes, the same day, 4).

Employee stress is measured with a dichotomous question asking whether employee's work affects his/her health stress and employee satisfaction with a question that asks respondents if on the whole they are satisfied or not with their main job (not at all satisfied, 0, to very satisfied, 3). To test hypothesis 4 regarding employee stress and satisfaction, I further include two questions asking whether employee's job involves working at very high speed and whether his/her job involves working to tight deadlines, which as suggested in previous literature could be indicators of work intensification (Green and McIntosh 2001). Both are measured on a seven point scale (never, almost never, around 1/4 of the time, around half of the time, around 3/4 of the time, almost all of the time, all of the time).

Control variables. Controls include gender, age, age^2, tenure, tenure^2, the level of education employees have completed, work status (full-time or part-time), the number of employees under each employee's supervision, firm size, along with dummy controls for type of employment contract, and occupation. Controls for industry representing two-digit Standard Industrial Classification (SIC) industries, and country dummies are also added.

5 Results

Before presenting the results of the estimation of equations, I report in Table 1 and Table 2 some descriptive statistics and correlations on the sample of employees. As shown, the highest correlations are observed between task rotation and teamwork ($r = 0.44$), and between high speed and tight deadlines ($r = 0.63$).

[Insert Table 1 and 2 about here]

Preliminary analysis was conducted in order to assess the difference in approaches to overdispersion observed in the count outcome variable with a mean much lower than the variance ($\mu = 3.140, var = 40.638$), without considering any covariates. Ordinary Poisson regression underestimates the standard errors, therefore alternatively I use a negative binomial regression for modeling the overdispersion. The dependent variable is the count of overtime, y_i which depends on observed X_{ik} and unobserved u_i variables. Considering that count variable, y_i has a negative binomial distribution, then I specify the model as such:

$$\begin{aligned} y_i &\sim Negbin(\mu_i, \sigma_y^2), i = 1, 2, \ldots, n \\ \log \mu_i &= \sum_{k=1}^{K} \beta_k X_{ik} + u_i, \quad k = 1, 2, ..., K \end{aligned} \tag{1}$$

where $\mu_i = E\{y_i | x_i\}, \sigma_y^2 = Var\{y_i | x_i\}$, X_{ik} is $n \times K$ dimensional matrix, indicating the number of independent variables (training, task rotation, productivity pay, gain sharing, teamwork, discretion over methods, discretion over schedule). A number of controls are also introduced in order to take into account the possible heterogeneity attached to individual and firm characteristics that might be related to overtime, apart from its association with the main explanatory variables.

Table 3 presents the overall results by introducing gradually the main explanatory variables of the study. Model 1 contains the individual human resource practices and indicates that coefficients are positive and significant in nearly all of them. Particularly, training, task rotation, productivity pay, gain sharing, and teamwork seem to be positively related to overtime, discretion over methods does not seem to differ from zero at a statistical significant level, while discretion over schedule and overtime are negatively related. Thus, lending evidence to hypothesis 1 which supports that individual human resource practices will be positively associated with employee overtime, with minor exceptions. Model 2 tests the potential association between complementary human resource practices and overtime. Here, the practices are entered individually with the addition of the human resource bundle variable. The coefficients for the individual human resource practices retain their sign and significance, with the exception of gain sharing. Nevertheless, the coefficient of the bundle turns out to be insignificant, which yields no support for Hypothesis 2 predicting that a bundle of human resource practices will be positively associated with employee overtime.

The next models introduce the uncertainty variables, individually and as moderators where each is interacted with the human resource practices and the bundle. In Model 3, what is observed is that when task uncertainty is added, individual human resource practices still retain their sign; contrary to the estimates in Model 5 in which when schedule uncertainty is added, some of them lose significance, inferring that overtime might be attributable to schedule uncertainty as well. Regarding the moderating effects (Models 4 and 6), it is found that task uncertainty affects both the relationship between training and overtime, and the relationship between teamwork and overtime, positively and significantly. For the latter type of uncertainty none of the interactions is significant. Thus, Hypothesis 3 which predicts that work uncertainty could moderate the relationship between human resource practices and overtime is partially supported.

As Norton, Wang, and Ai (2004) note, the sign, magnitude, and significance of the marginal effects vary across observations, suggesting that in order to identify the true interaction effects for nonlinear models, supplementary analysis is needed in which interactions could be better examined graphically. Taking into account the aforementioned issue, I convert overtime, and task uncertainty variables into dummies, and I fit separate logit models for each interaction term introduced. Figures 1 and 2 help to interpret the marginal effects of the interactions between training and task uncertainty, and teamwork and task uncertainty, correctly, and as depicted, they are mainly positive and significant.

[Insert Figures 1 and 2 about here]

Other interesting results include the coefficient of the human resource bundle which turns out to be positive and significant in the last two models. Amongst the controls, male shows a positive and statistically significant coefficient. Also, the sign of age is positive and significant, while the sign of age^2 is negative and significant; implying that the relationship between age and the probability of overtime is positive initially, but then eventually becomes negative inferring that there is a turning point in the relationship between them. In contrast, overtime is negatively associated with tenure and positively related to education, full-time work status, supervision, and firm size, some occupation, industry, and country dummies.

[Insert Table 3 about here]

Supplementary tests are conducted to assess whether the patterns of the results are robust to alternate specifications and samples. First, I run additional regressions for different types of training in an effort to observe whether there are variations in the estimates depending on the training activity applied. Training could be positively related to greater worker time expenditure, but an issue arising is whether this positive link is due to the nature of training activity or because during training, the employee is performing in a different environment. Results show that training provided by the employer, training paid by the employee, and different forms of on-site training and learning are positively and significantly associated with overtime, whereas for on-the-job training, I find no results. This absence of association might be attributed to the fact that during on-the-job training employees do not lose so much time because of learning compared to other types of training, suggesting that other training activities better explain variations in employee overtime. Second, previous literature has shown that the public sector has experienced greater intensification than the private sector (Green 2004). Therefore, I replicate the analyses in subsamples by dichotomizing the sample into public and private sector employees. Results proved to vary marginally from those reported in Table 3.

In the last step of the analysis, I try to proxy whether overtime is a waste of time or not. I run regressions including overtime and two more indicators of work intensification, high speed and tight deadlines (Green and McIntosh 2001), as predictors of employee stress and satisfaction. In the first case, the dependent variable, employee stress, is binary. Given that, the model takes the form:

$$P = (y = 1|X) = F(X\beta) \tag{2}$$

where F is the logistic function: $F(Z) = \exp(z)/[1 + \exp(z)]$ taking values strictly between 0 and $1 : 0 < F(Z) < 1$.

In the second case, I use an ordered logit in order to examine the link between overtime and the categorical outcome variable, employee satisfaction, with more than two levels (not at all satisfied, 0, to very satisfied, 3).

Model 7 in Table 4 reports the estimates of a logit model for the relationship between overtime and employee health stress. The coefficient for overtime proved to be significantly positive, suggesting that working longer hours contributes to employee health stress. Similar results are found for the other two indicators of work intensification, high speed and tight deadlines. Concerning the human resource practices, training seems to be positively and significantly associated with employee stress, while discretion over schedule seems to be negatively related to it. Further, the coefficients of work uncertainty expressed either as task uncertainty or schedule uncertainty, are positive and strongly significant. The opposite pattern of results appears for the link between overtime and employee satisfaction. The estimates in Model 8 show that the association between these two components is negative and highly significant, indicating that working overtime adds negatively to employee satisfaction. The same relationship is found for the other two indicators of work intensification. In addition, the coefficients of training, gain sharing, discretion over methods and schedule are all positive and significant, whereas work uncertainty shows negative coefficients. Other interesting results include the negative coefficient of male, inferring that females seem to be more stressed at work than males.

Thus, hypothesis 4 predicting that the more overtime an employee is working in the firm, the higher the likelihood to show stress at work, and the lower the likelihood to be satisfied is fully supported. The overall results of these regressions provide additional support to the previous findings, revealing that some of the variation in stress and satisfaction is attributed to overtime, and work uncertainty.

[Insert Table 4 about here]

6 Discussion

The core idea of the paper conjectures that although human resource practices provide a number of benefits to employees, they could also be one of the important reasons related to work intensification. Results provide evidence for this argument by showing a positive relationship between these practices

and overtime. However, it is highly likely that employee overtime is also related to more exogenous factors, such as the level of uncertainty at work. For instance, an increase in demand could make employees to work harder and/or exceed normal working hours. Given that there is no direct measure in the survey to account for these shifts, task interruptions in order to take on an unforeseen task or changes in schedule could be used as proxies, inferring that a modification is usually taking place when an employee has to work more hours rather than less hours in order to meet job demands. The findings show that when work uncertainty is entered into the equation, some of the human resource practice coefficients lose their significance, suggesting that part of the variation in overtime is attributed to uncertainty. Also, the estimates of the moderators reveal that some human resource practices are related to overtime only in environments that are characterized by higher levels of uncertainty. Furthermore, when the link between work intensification and employee stress or satisfaction is examined, results reveal that the more the overtime, the higher the likelihood of health stress, and the lower the likelihood of employee satisfaction. These estimates help to identify whether overtime is time wisely used, inferring that when employees are stressed is more probable that working time is spent on a job related task and is not wasted. This idea is further confirmed by the employee satisfaction results.

The study has its limitations some of which provide opportunities for further research. First, even though the dataset comes from a rich cross sectional survey which contains a very objective measure of work intensification, one should bear in mind that there are a number of cautions attached to the findings regarding the cross sectional nature of the research and the potential claims of causation. Second, although a detailed methodological framework has been put in place in order to ensure that the survey is carried out to the highest specifications and scientific standards, self-report, cross-sectional data are susceptible to biases associated with common variance method. This bias is most problematic in studies in which data for both the predictor and the criterion variable are obtained from the same source at one time. The problem lies in the difficulty of determining whether observed covariance among the constructs examined is attributable to valid relationships or to common method variance (Podsakoff, MacKenzie, Lee, and Podsakoff 2003).

Another point claiming for attention is the notion of complementarity which although very intuitively appealing, it is not easy to be measured. Prior work evaluating this concept (MacDuffie 1995; Huselid 1995) has employed divergent measures of human resource complementarity, such as arbitrarily grouping practices into three or four types of human resource practice bundles or using factor analysis to generate an index of practices with very mixed empirical results (Delaney and Huselid 1996). Fol-

lowing other authors (e.g. MacDuffie 1995), this paper is using a less restrictive strategy which allows a range of combinations and as a result practices are not neatly classified into discrete types. However, there might be other practices affecting employee overtime not included in the bundle.

Finally, the study implies that scholars who are interested in understanding the impact of human resource practices should give more attention to work intensification inferring that benefits attributed to these practices could be weakened by costs in the form of longer hours spent at work. It may represent an extreme argument given that the dataset employed for the purposes of the study does not contain any measure of productivity, and thus does not allow making predictions for the other side of the story. Still, findings can challenge previous studies and call into question existing findings that measure productivity without taking into account the change in the number of hours worked. Findings could also offer some basic suggestions to managers who seek to introduce human resource practices in an effort to improve performance, supporting that maintaining a balance between the adoption of human resource practices and work intensification might be of some importance.

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Table 1. Summary statistics

Variables	N	Mean	Std. Dev	Min	Max
1. Overtime	28,505	3.140	6.375	0	31
2. Training	29,491	0.481	0.500	0	1
3. Task rotation	29,251	0.450	0.497	0	1
4. Productivity pay	24,049	0.121	0.326	0	1
5. Gain sharing	23,946	0.083	0.275	0	1
6. Teamwork	29,209	0.585	0.493	0	1
7. Discretion over methods	29,437	0.844	0.363	0	1
8. Discretion over schedule	29,419	0.900	0.300	0	1
9. Task uncertainty	29,383	1.233	0.982	0	3
10. Schedule uncertainty	18,844	0.766	1.332	0	4
11. Stress	12,302	0.646	0.478	0	1
12. Satisfaction	29,413	1.991	0.754	0	3
13. High speed	29,351	2.552	2.079	0	6
14. Tight deadlines	29,280	2.658	2.120	0	6

$* p < 0.05$

Table 2. Correlations

Variables	1	2	3	4	5	6	7
1. Overtime	1.000						
2. Training	-0.018*	1.000					
3. Task rotation	-0.003	0.148*	1.000				
4. Productivity pay	0.051*	-0.017*	0.002	1.000			
5. Gain sharing	0.049*	0.105*	0.048*	0.093*	1.000		
6. Teamwork	-0.010	0.188*	0.437*	0.019*	0.059*	1.000	
7. Discretion over methods	0.048*	0.102*	0.007	-0.030*	0.045*	-0.019*	1.000
8. Discretion over schedule	0.034*	-0.008	-0.031*	-0.002	0.060*	-0.058*	0.156*
9. Task uncertainty	0.067*	0.191*	0.178*	-0.061*	0.063*	0.164*	0.143*
10. Schedule uncertainty	0.143*	0.045*	0.103*	0.070*	0.017*	0.070*	-0.001
11. Stress	0.082*	0.128*	0.045*	-0.040*	0.036*	0.041*	0.037*
12. Satisfaction	-0.085*	0.101*	-0.009	-0.076*	0.038*	-0.015*	0.114*
13. High speed	0.114*	0.040*	0.122*	0.096*	0.028*	0.121*	-0.055*
14. Tight deadlines	0.117*	0.082*	0.114*	0.083*	0.049*	0.135*	-0.034*

	8	9	10	11	12	13	14
8. Discretion over schedule	1.000						
9. Task uncertainty	0.050*	1.000					
10. Schedule uncertainty	-0.010	0.111*	1.000				
11. Stress	-0.037*	0.170*	0.072*	1.000			
12. Satisfaction	0.112*	-0.003	-0.097*	-0.093*	1.000		
13. High speed	-0.039*	0.206*	0.143*	0.130*	-0.134*	1.000	
14. Tight deadlines	-0.041*	0.230*	0.133*	0.140*	-0.122*	0.626*	1.000

** $p < 0.05$*

Table 3. Results of a Negative Binomial Model for Employee Overtime

Variables	*Model 1*	*Model 2*	*Model 3*	*Model 4*	*Model 5*	*Model 6*
Training	0.187***	0.163***	0.128***	-0.026	0.089	0.081
	(0.040)	(0.045)	(0.045)	(0.069)	(0.057)	(0.065)
Task rotation	0.167***	0.138***	0.101**	0.099	0.071	0.070
	(0.038)	(0.043)	(0.043)	(0.068)	(0.055)	(0.063)
Productivity pay	0.258***	0.222***	0.218***	0.174*	0.010	0.010
	(0.057)	(0.060)	(0.060)	(0.091)	(0.076)	(0.090)
Gain sharing	0.126*	0.102	0.081	-0.063	0.061	0.064
	(0.065)	(0.067)	(0.067)	(0.114)	(0.095)	(0.110)
Teamwork	0.134***	0.117***	0.084**	-0.011	0.136**	0.137**
	(0.041)	(0.043)	(0.043)	(0.066)	(0.054)	(0.062)
Discretion over methods	0.076	0.071	0.035	0.031	0.031	0.032
	(0.049)	(0.049)	(0.049)	(0.070)	(0.058)	(0.067)
Discretion over schedule	-0.183***	-0.210***	-0.223***	-0.148*	-0.285***	-0.287***
	(0.056)	(0.059)	(0.059)	(0.086)	(0.067)	(0.076)
Bundle		0.077	0.086	0.146	0.134*	0.181**
		(0.060)	(0.060)	(0.102)	(0.077)	(0.091)
Task uncertainty			0.175***	0.083		
			(0.019)	(0.073)		
Schedule uncertainty					0.221***	0.232***
					(0.017)	(0.068)
Interaction terms						
Task uncertainty * Training				0.132***		
				(0.042)		
Task uncertainty * Task rotation				0.017		
				(0.042)		
Task uncertainty * Productivity pay				0.036		
				(0.058)		
Task uncertainty * Gain sharing				0.103		
				(0.064)		
Task uncertainty * Teamwork				0.087**		
				(0.042)		
Task uncertainty * Discretion over methods				0.007		
				(0.049)		
Task uncertainty * Discretion over schedule				-0.060		
				(0.055)		
Task uncertainty * Bundle				-0.068		
				(0.060)		
Schedule uncertainty * Training						0.007
						(0.040)
Schedule uncertainty * Task rotation						-0.002
						(0.040)
Schedule uncertainty * Productivity pay						0.004
						(0.051)
Schedule uncertainty * Gain sharing						-0.005
						(0.067)

Table 3 (cont.)

Variables	*Model 1*	*Model 2*	*Model 3*	*Model 4*	*Model 5*	*Model 6*
Schedule uncertainty * Teamwork						-0.003
						(0.041)
Schedule uncertainty *						0.001
Discretion over methods						(0.042)
Schedule uncertainty *						0.002
Discretion over schedule						(0.047)
Schedule uncertainty * Bundle						-0.050
						(0.057)
Controls						
Male	0.625***	0.624***	0.648***	0.649***	0.587***	0.587***
	(0.040)	(0.040)	(0.040)	(0.040)	(0.053)	(0.053)
Age	0.032***	0.031***	0.032***	0.032***	0.045***	0.045***
	(0.011)	(0.011)	(0.011)	(0.011)	(0.014)	(0.014)
Age^2	-0.0004***	-0.0004***	-0.0004***	-0.0004***	-0.001***	-0.001***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0002)	(0.0002)
Tenure	-0.014**	-0.013**	-0.016**	-0.015**	-0.009	-0.009
	(0.006)	(0.006)	(0.006)	(0.006)	(0.008)	(0.008)
$Tenure^2$	0.0001	0.0001	0.0001	0.0001	-0.0001	-0.0001
	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)
Education	0.023**	0.023**	0.016	0.018	0.014	0.014
	(0.011)	(0.011)	(0.011)	(0.011)	(0.015)	(0.015)
Fulltime	1.279***	1.291***	1.262***	1.266***	1.194***	1.192***
	(0.057)	(0.057)	(0.057)	(0.057)	(0.077)	(0.077)
Supervision	0.005***	0.004***	0.004***	0.004***	0.006*	0.006*
	(0.001)	(0.001)	(0.001)	(0.001)	(0.003)	(0.003)
Firm size	0.029***	0.031***	0.032***	0.032***	0.056***	0.056***
	(0.011)	(0.011)	(0.011)	(0.011)	(0.015)	(0.015)
Contract	Yes	Yes	Yes	Yes	Yes	Yes
Occupation	Yes	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes	Yes
Country	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-2.378***	-2.327***	-2.458***	-2.428***	-3.165***	-3.160***
	(0.354)	(0.355)	(0.354)	(0.361)	(0.459)	(0.461)
Wald x^2	1562.84	1564.09	1642.98	1662.08	1104.16	1105.8
Log-Likelihood	-31540.36	-31453.07	-31288.78	-31279.23	-21352.87	-21352.02
Observations	19,556	19,507	19,417	19,417	14,441	14,441

Regression coefficients are reported, with standard errors in parentheses. "Yes" means that the indicated variable is included in each model equation. All regressions include 5 types of employment contract dummies, 4 occupation dummies, 11 industry dummies, and 30 country dummies. Levels of significance: *** p<0.01, ** p<0.05, * p<0.1.

Table 4. Results for Employee Stress and Employee Satisfaction

Variables	*Model 7 Logit for Employee Stress*	*Model 8 Ordered Logit for Employee Satisfaction*
Overtime	0.029***	-0.017***
	(0.006)	(0.004)
	1.029	*0.984*
High speed	0.078***	-0.095***
	(0.018)	(0.011)
	1.081	*0.909*
Tight deadlines	0.093***	-0.066***
	(0.017)	(0.010)
	1.097	*0.936*
Training	0.267***	0.149***
	(0.075)	(0.042)
	1.306	*1.160*
Task rotation	-0.026	0.025
	(0.070)	(0.041)
	0.974	*1.025*
Productivity pay	-0.119	0.007
	(0.094)	(0.058)
	0.888	*1.007*
Gain sharing	0.152	0.132*
	(0.119)	(0.073)
	1.164	*1.141*
Teamwork	-0.055	-0.018
	(0.072)	(0.041)
	0.947	*0.982*
Discretion over methods	0.099	0.307***
	(0.075)	(0.044)
	1.104	*1.360*
Discretion over schedule	-0.292***	0.453***
	(0.084)	(0.050)
	0.747	*1.573*
Bundle	0.017	0.035
	(0.101)	(0.059)
	1.017	*1.036*
Task uncertainty	0.287***	-0.172***
	(0.033)	(0.019)
	1.333	*0.842*
Schedule uncertainty	0.069***	-0.108***
	(0.022)	(0.013)
	1.071	*0.897*

Table 4 (cont.)

Variables	*Model 7*	*Model 8*
Controls		
Male	-0.140**	-0.059
	(0.071)	(0.040)
	0.869	*0.942*
Age	0.066***	-0.034***
	(0.019)	(0.010)
	1.068	*0.967*
Age^2	-0.001***	0.0004***
	(0.0002)	(0.0001)
	0.999	*1.000*
Tenure	-0.007	0.007
	(0.011)	(0.006)
	0.993	*1.007*
$Tenure^2$	0.0004	-0.0001
	(0.0003)	(0.0001)
	1.000	*1.000*
Education	0.128***	0.022*
	(0.021)	(0.011)
	1.137	*1.021*
Fulltime	0.157	0.097*
	(0.102)	(0.054)
	1.171	*1.101*
Supervision	-0.0005	0.010***
	(0.002)	(0.002)
	1.000	*1.010*
Firm size	-0.005	-0.043***
	(0.019)	(0.011)
	0.995	*0.958*
Contract	Yes	Yes
Occupation	Yes	Yes
Industry	Yes	Yes
Country	Yes	Yes
Constant	-2.176***	1.224***
	(0.632)	(0.342)
Pseudo R^2	0.129	0.074
Log-Likelihood	-3544.28	-14043.94
Observations	6,233	14,154

Regression coefficients are reported, with standard errors in parentheses, and odds ratios as italised numbers. “Yes” means that the indicated variable is included in each model equation. All regressions include 5 types of employment contract dummies, 4 occupation dummies, 11 industry dummies, and 30 country dummies. Levels of significance: *** p<0.01, ** p<0.05, * p<0.1.

Figure 1. Interaction Effects after Logit

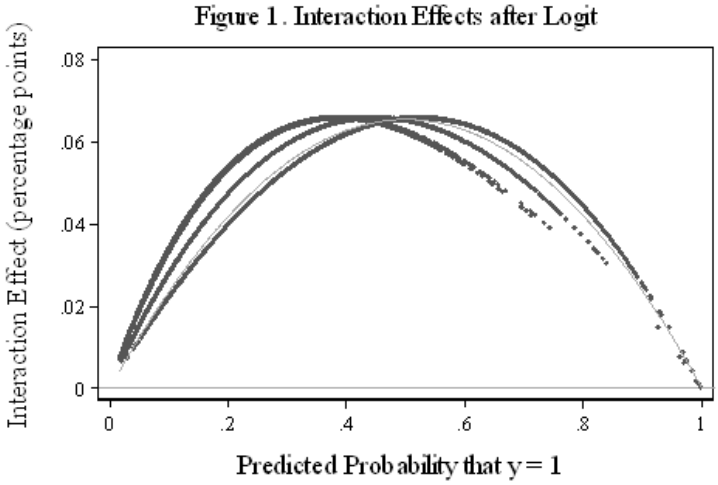

Figure 2. Interaction Effects after Logit