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AUTONOMY IN KONWLEDGE-INTENSIVE ACTIVITIES; EFFICIENCY OR INCENTIVES?

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Abstract

Job autonomy is a key dimension of knowledge-intensive activities. Vast literature addresses how job autonomy affects employees? satisfaction and organizational performance, yet it is not clear how job autonomy relates to employee?s personal characteristics (skill, knowledge, or experience), or to the fit between employees and firm activities. In this paper, we empirically investigate the relation among job autonomy, employees? characteristics, and fit. Using a novel dataset which is based on a specifically designed survey of inventors, we first provide evidence of some unexpected patterns. Second, we propose that there are two main reasons why firms may grant job autonomy: for efficiency purposes and to better motivate their employees. Our theory has elements of novelty that allow to answer the empirical observations.

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INTRODUCTION

Autonomy and delegation are ubiquitous in organizations, and they are of prominent importance in knowledge-intensive contexts, i.e., in those activities where the employee's assigned tasks are less routine and scheduled. Various lines of literature have addressed job autonomy, yet '...autonomy is often at the heart of heated debates in management.' (Gagné and Bhave, 2011). Indeed, the drivers of job autonomy and the effects on employees' behaviour and on firms' performance are not fully understood. In this paper, we address empirically the extent at which firms rely on job autonomy when managing human capital in knowledge-intensive activities.[1]

This is an important issue because human capital is key in firms' value creation process. The effective management of key employees may be the ultimate determinant of organizational performance and sustained competitive advantage (Youndt, Snell, Dean Jr., and Lepak, 1996), yet it poses serious managerial challenges (Coff, 1997). Firms use several instruments in their attempt to retain and motivate key employees. These are still open issues in the literature (Campbell et al., 2011), and the role of job autonomy in this respect is not clear.

Classic works on job design (e.g. Hackman and Oldham, 1975, 1980), contingency theory (e.g. Ouchi, 1979, 1980), and on leadership (e.g. Vroom and Jago, 1988; Vroom and Yetton, 1973), as well as the more recent works in innovation and knowledge management (e.g., Sauermann and Cohen, 2010; Stern, 2004), emphasize the positive role of working autonomy on the employees' performance, creativity and satisfaction. Nevertheless, the question on how autonomy relates to the employees (e.g. their skill, knowledge, or experience) and to the job's

[1] We take the classic Hackman & Oldham (1980) definition of job autonomy as 'the degree to which the job provides substantial freedom, independence, and discretion to the individual in scheduling the work and in determining the procedures to be used in carrying it out'.

characteristics has not been investigated deeply (Morgeson and Humphrey, 2008). Yet, a vast literature has demonstrated that the fit between employees and their job, the team, and the organization, matters for a wide variety of outcomes (Kristof, 1996; Kristof-Brown, Zimmerman, and Johnson, 2005).

The works linking autonomy to the fit between an employee's characteristic and the job take for granted that to a better fit corresponds greater autonomy. Some studies assume that the employee's knowledge and skills are a prerequisite for greater autonomy (see e.g. Clegg and Spencer, 2007, Ouchi, 1979, Grant and Parker 2009, Vroom and Yetton, 1973). Also, when employees are likely to have more expertise than top managers about their own specialized work activities, they are more capable of making the right decisions involving the tasks and use of resources (Vroom and Jago, 1988; Yukl and Fu, 1999). Thus, an individual that is more fitted for a given job can make better decisions, and so decision autonomy is efficiently delegated to the employee. We label this channel as the efficiency channel of autonomy.

We have checked whether the efficiency-based explanation for autonomy is reflected in the data using a novel dataset based on a specifically designed survey of inventors for EPO granted patents. Figure 1 shows the mean of autonomy levels reported by the employees-inventors in our sample, sorted by the of level of fit between their skill and experience with the employer's activities. The figure is generated using our novel survey data drawn from the 'Innovative S&T indicators for empirical models and policies' (hereafter, Inno S&T). The values on the axes correspond to the participants' responses on a five-point Likert-type scale to questions that aim to capture a measure of fit. As seen clearly from Figure 1, the efficiency channel alone does not seem to be able to explain the observed pattern. The figure shows that as the fit between

employees' skills and the job improves, the employers provide at first less autonomy to the employees. Why is this so?

Insert Figure 1 about here

In this paper, we aim to come up with a solution to this puzzle by answering the following questions: To whom and how much shall the employer delegate autonomy? How does the fit *between employees' and jobs' c*haracteristics affect autonomy? To solve the puzzle and answer these questions, we account for a second important channel driving the employer's decision to provide autonomy, having to do with the provision of the incentives. Following Gambardella et al. (2013), we argue that when there are strong ties between the employee's skills, experience, and knowledge and the firm's activities, the employee gains higher personal benefits, motivation is less of a concern, and the employer can offer lower working autonomy and still retain and motivate the employee. On the contrary when the firm's activities do not fit with the employee's experience and skills, the employer needs to grant greater autonomy to properly incentivize and motivate the employee. We label this the incentive channel of autonomy, which goes in the opposite direction of the efficiency-based explanation above. The overall effect of the fit between the employer and the firm's activities will depend on the aggregate effects of these two channels.

To investigate the role of the efficiency and the incentive channel and estimate the determinants of job autonomy, we use a novel dataset which is based on a specifically designed survey of inventors for EPO granted patents with priority dates in 2003–2005 in twenty European countries, U.S., Japan, and Israel. We take an explorative approach, trying to discover grounds to justify an empirical phenomenon. In the language of Will Mitchell and Anne Tsui

(2012), we are following a 'green' research approach, addressing empirical questions and using the framing and results to advance the understanding of theory:

'The green researcher needs to develop new concepts because of failure to find encompassing logic within one or more existing theories that is adequate to study the empirical phenomenon and/or interpret the analysis[...] Thus, green research has the dual outcome of answering empirical questions and advancing theory.'

We believe that our empirical investigation points in the direction of explaining the empirical puzzle highlighted above, allowing for a better understanding of the antecedents of job autonomy. In so doing, we contribute to research in strategy in several ways. First, by highlighting and addressing an empirical puzzle, we point toward an important gap in the literature, advancing then the theory and explaining a phenomenon that escapes the explanation provided by extant theories. Second, we address an ubiquitous and important issue for firms, seeking to investigate more deeply the relation between autonomy and fit – both by extending the theory and using a novel and unique dataset, extracted from a specifically designed survey to address this question. Third, by considering explicitly the incentive channel next to the efficiency channel of job autonomy, we improve our understanding of the outcomes of delegation. Fourth, by relating job autonomy to firms' activities and resources, our work complements a relatively recent streams of literature suggesting a potential role for a firm's technological capabilities on its governance decisions and strategy (see Hoetker, 2005; Leiblein and Miller, 2003; Martin and Salomon, 2003; Mayer and Solomon, 2006; Wright and Snell, 1998). Finally, by linking job autonomy to employee characteristics -via efficiency and incentive channel- we offer some managerial insights for the strategic decisions to provide decision autonomy at the project level.

The remainder of this paper is organized as follows. Section 2 discusses the theoretical background, whereas the empirical setting, data, and the sample employed in the study are described in section 3. Section 4 reports and discusses the main results, and section 5 concludes.

WORKING AUTONOMY AS A INCENTIVE INSTRUMENT

We begin discussing the theoretical background for the employers' decision to provide job autonomy. We first emphasize the traditionally recognized channel of autonomy, based on efficiency, and discuss how it is linked to the employee's characteristics. Then, we discuss the alternative explanation based on the provision of the incentives. We also highlight how these two explanations relate to the fit between the firm's knowledge-intensive activities and the employees' characteristics, pointing to an aspect that has not been deeply investigated. Finally, by examining the effect of the two channels on job autonomy, we derive a few theoretical implications.

The efficiency channel

The existing literature has mostly addressed the notion of job autonomy as a key characteristic of the workplace which affects the performance of the employer.

In their pioneering work on job design, Hackman and Oldham (1975) highlight that autonomy is one of the core job characteristics that affects the employee, and eventually her performance. Different streams of organization literature discuss how job autonomy affects performance, highlighting how autonomy affects the employee's well-being (Deci et al.,2001; Gagné and Bhave, 2011) and job satisfaction (Benz and Frey, 2008a; Sousa-Poza and Sousa-Poza, 2000). However, most of these studies do not address the role of an employee's characteristics.

The literature on leadership and professionals relates the outcomes of autonomy to employees' skills and capabilities. The leader-member exchange theory suggests that leaders delegate more tasks and give more autonomy to employees who are more capable and skilled.

Recent works in job design also highlight that more skilled and motivated employees tend to be granted more autonomy (Clegg and Spencer, 2007; Grant and Parker, 2009). Thus, to the extent that employees have more expertise than the managers in specific tasks and projects, they may be more capable of making the right decisions involving the use resources (Yukl and F, 1999). Therefore, the employer may decide to grant more autonomy to the more skilled employees as a way to attain higher efficiency. According to this efficiency channel, we expect a positive relation between the employee*'s* fit quality with a given task or project and his or her job autonomy (Figure 2) .

Insert Figure 2 about here

The incentive channel

As mentioned in the introduction, the decision about job autonomy is of prominent importance for employees with higher levels of knowledge and skills that carry out knowledge-intensive activities. Less knowledgeable employees typically deal with simpler, more routine and scheduled tasks, where the job autonomy is inherent to the task, or there is not much room for a delegation. Indeed, most of the efficiency arguments, based on the fact that employees may have greater knowledge and expertise, relate to the more complex and knowledge-intensive activities within a firm.

From the employees' side, the literature highlights the importance of autonomy for the highly educated and more knowledgeable individuals. These individuals seek and value more autonomy and discretion in their workplace (Baylin, 1985; Raelin, 1991; Davenport, 2005). Also, autonomy allows the employees to take credit for their decisions and receive achievements

of their own (Gagne and Deci 2005, Sauermann and Cohen, 2010), which is more relevant for the case of employees with higher knowledge level. Empirical evidence also supports the positive effect of autonomy on the employee's innovative behavior (Shalley, Gilson and Blum, 2000).

We then expect autonomy to have a more significant motivation effect for those employees with higher knowledge levels. On the other hand, there are special features of knowledge-based activities that make the management of human capital more challenging (Coff, 1997; Gambardella, Panico and Valentini, 2013). The difficulty to observe the employees' actions, and output makes it harder for an employer to establish a compensation based on their contribution to production. The standard pay-for-performance schemes are unsuitable or not appropriate because they might also increase the contractual hazards (Mayer and Solomon, 2006). Firms may then use job autonomy as an alternative tool for managing and motivating their knowledgeable employees. On the other hand, the employees may have objectives that differ from the ones of the employer, who then might be reluctant to delegate too many decisions that involve the use of assets.

Job autonomy and control over the firm's resources is an instrument that can be used to incentivize knowledge employees (Gambardella, Panico and Valentini, 2013). An employee in a knowledge-intensive activity may prefer greater autonomy to carry out her objectives and obtain personal benefits. Yet, the firm may have different scopes. However, when there is strong fit between the firm's activities and the employee's skills and knowledge, the latter can gain higher benefits, and so the employer can offer lower job autonomy but still motivate the employee. On the contrary, when the firm's activities does not fit well with the employee's knowledge and

skills, the employer needs to grant greater autonomy to properly motivate the employee. This is the essence of what we label as the incentive channel of autonomy.

The difficulties that are inherent in the agency relationship between the employer and the employee add a new dimension to the role of job autonomy. Thus, the efficiency and the incentive channel of job autonomy may point at different directions. By considering simultaneously these two channels, we then may obtain some hints to solve the empirical puzzle that we discuss in the beginning of the paper. We aim to address this empirically.

According the discussion above, we expect the employer-employee fit to be a key determinant of the job autonomy level both for incentive purposes as well as efficiency reasons. Via the incentive channel –and absent of the efficiency channel- we expect employers to offer less autonomy when there is a better between employees and firm activities. In the other words, controlling for the efficiency channel, we expect a negative relation between the employer-employee fit quality and the employee's working autonomy (Figure 2) .

In view of the discussion above, we also expect that delegating of autonomy, impacts employee's motivation much more for the cases where the fit is poor than the cases where the employee fits well the project. This is because the good fit employee is already motivated in the project which matches her background, compared to the poorly fit employee who is not taking much private benefits from working in a project with does not match her.

The incentive channel and the role of fit, is a novel dimension that can offer a different view to the role of autonomy as studied in the literature on job engagement, that does not address directly the employee's characteristics. We believe that bringing this novel channel into the picture may be the solution to the empirical puzzle we discussed in the first section, as explained below.

Efficiency and incentive; the overall effect

The two channels discussed in the previous sections point toward a different relation between job autonomy and fit. This is represented graphically in Figure 2. The overall effect of the fit on the employee's autonomy will depend on the aggregate of the both effects.

The relation between fit and job autonomy is not obvious, and it remains an empirical question. Although we would not observe each channel independently, yet, we can discuss two extreme cases on the employer-employees fit axis to better understand the relation.

On the far right of the horizontal axis, we have those cases where there is a good fit between the employee's knowledge and the employer's activities. According to the efficiency channel, job autonomy will generate the best outcome for the employer. However, due to the good fit, the employee gains personal benefits, and so the employer can offer low job autonomy and still provide enough motivation to the employee. Therefore, if we observe higher autonomy in the good fit, relatively to the cases of lower fits, this will imply that the efficiency channel becomes increasingly stronger and dominates the incentive channel.

On the contrary, on the left of the horizontal axis in Figure 2, we have those cases where the employer-employee fit is poor. On the one hand, there are low efficiency gains from delegating. On the other hand, the employee must be motivated because she does not gain much personal benefit from carrying out her tasks. Through the incentive channel, we expect the employee to have more job autonomy in this case. Therefore, if we observe greater autonomy levels for the poor fit case, it implies that the incentive channel becomes increasingly stronger and dominates the efficiency channel.

In the next section we address empirically the relation between job autonomy and fit.

METHOD

Data and Sample

Our empirical strategy is performed on a restricted use, extensive data drawn from the 'Innovative S&T indicators for empirical models and policies' survey. This dataset is based on a survey of inventors for the EPO granted patents with priority dates between 2003 –2005 in twenty European countries, U.S., Japan, and Israel. The survey has been specifically designed to address our questions and therefore, the generated measures match perfectly with the key variable of our theory. The dataset covers a wide range of complementary indicators at the level of knowledge employees, companies, regions and technologies. At the individual-level, the survey includes the personal characteristics (e.g., age, gender, education, motivations and etc.) and employee's perceived job dimensions. At the firm-level, the survey collects data on the characteristics of the organization such as company's type, age, size, activities, governance and etc. More details about the survey project, methodology and the primary indicators are described in Gambardella et al. (2012). Also, company-level complementary indicators have been matched with the survey data using Amadeus, Orbis and Compustat.

For the purpose of our study, we focus on the knowledge employees employed in the private firms and exclude the employees of academic institutions and non-profit organizations. We also select our sample from the employees who have moved at least once from the beginning of their career. This helps us to build more accurate measures of the employee-employer fit since it allows us to measure the fit with respect to the employee's previous job experience and knowledge. We expect that using previous workplace as a reference, will increase the precision of self-reporting the fit measures. Without a reference point, it is more likely that the employees do not have a sense of potential matches for their skill in the job market.

Building our sample from the private sector mobile employees, we end up with about 3,000 observations proper for our study. Most of our analysis is conducted on this sample of inventors. We report the statistical summary regarding our sample in the following sections. Also, in our analysis, we check if sampling has biased our results.

Key Measures

Working autonomy. By the autonomy in the workplace, we intend to capture the degree to which the job provides employee with independence in determining her tasks, time allocation among them and scheduling her work. Autonomy is the central variable in our analysis as the dependent variable. In the empirical section, we estimate the determinants of employee's autonomy level.

Since our survey has been carefully designed for the purposes of this study, we benefit from a wide range of measures corresponding different dimensions of autonomy. Our measures are based on a question from the survey asking respondents to rate their autonomy level, on a Likert scale from one ('no autonomy') to six ('very high autonomy') on the items:

(a) 'selection of your tasks or projects', (b) 'allocation of your working time among different tasks or projects', and (c) 'flexibility of your working hours'.

We use the responses to the questions above to build three alternative measures of autonomy (AUT1, AUT2, and AUT3 respectively). To build a broad measure of employee's autonomy (AUTONOMY), we simply sum up the responses over the items above. Besides the

broad autonomy measure, we use each of the alternative three measures independently to check the robustness of our results.

Employer-employee fit. The quality of fit between the employee's experience, knowledge and skills with the employer's activities is the key predictor in our study for both channels of autonomy. Therefore, it is considered the main independent variable for this analysis. Again, our designed survey allows us to consider various measures for the employer-employee fit. We employ a question from survey, asking the respondent to indicate to which extent they agree or disagree with the following statements:

a.*'... the combination of your previous experience with the knowledge of your new employer was* instrumental in enhancing the inventive activity at the new organization.'

b.' *... a significant part of your previous inventive experience was no longer applicable to the new organization's inventive activities.'*

c. ' *... you had to invest a large proportion of* your work time to acquire new technical knowledge to be able to perform your new job.'

The first statement captures a more broad concept of fit, between the employee's experience and the knowledge of the employer. We make use of this item to build the broad variable for the employee-employer fit. The second and third statements, more specifically focus on the experience fit and knowledge fit respectively. We use the broad variable (FIT) as the main proxy for the employer-employee fit and consider the next two proxies (FIT_EXP and FIT_KNOW) as robustness checks. In accordance with our econometrics specification, we generate the square of our fit measures (FIT_SQ, FIT_EXP_SQ, and FIT_KNOW_SQ) to check for the nonlinearities in the effect of fit on the autonomy.

Employee's motivation level in the project. The whole idea behind the incentive channel, is to motivate the employees. Therefore, their motivation level is highly relevant for this study. Unfortunately, it is extremely difficult to measure this. However, to build the variable capturing employee's motivation level for the project, we have used a question in our survey which asks the respondents about the importance of intellectual challenge in the project as their motivation for making the corresponding invention. Although, this may not be exactly the overall level of an employee's motivation, we believe it can be a good proxy for this concept. Especially, intellectual challenge is a proper motivation for the sake of this study, since our theory discusses that delegating autonomy via the incentive channel, will let the employee to shift the project direction towards her preferred targets, and the scientific challenges that she enjoys.

The question which we take from the survey, asks respondents to rate the importance of intellectual challenge as their motivation to invent, at the time of this particular invention. The respondent could answer to the question by choosing the importance of this motivation on a Likert scale, ranging from one ('not so important') to five ('very important').

Controls

We control for a range of variables at the level of individuals, companies, regions and technological areas. All the data regarding the controls are extracted from the InnoS&T survey. At the individual level, we control for the gender, age and gross income of the employee. Moreover, we control for the inventor’s level of education and rank in the firm’s structure. At the firm level, we control for the size of the firm and size of the project which the employee was assigned at the time of survey (as the man-month level of the project). Finally, due to potential

role of technology-specific and geographical factors, we include dummies for the location of the employee and technological areas.

A brief variable definition and summary of their statistics and correlations are presented in Tables 1 and 2.

Insert Tables 1 and Table 2

Empirical Strategy

In the empirical analysis, we estimate the determinants of working autonomy for employees for our sample. Our dependent variables (measure of working autonomy) is reported in levels, which would typically require the use of an ordered regression model. We postulate a model as follows with robust standard errors:

$$\mathbf{P}(\text{autonomy}_i = j) = \boldsymbol{\Phi}(\theta_j - \beta_1 \text{fit}_i - \beta_2 \text{fit\_sq}_i - \mathbf{X'}_i\boldsymbol{\gamma}) - \boldsymbol{\Phi}(\theta_{j-1} - \beta_1 \text{fit}_i - \beta_2 \text{fit\_sq}_i - \mathbf{X'}_i\boldsymbol{\gamma}) \qquad (1)$$

In the equation above j is one of the J categorical levels of autonomy for the employee i. θ_j is a cutoff point, estimated by the model (with $\theta_0 = -\infty$ and $\theta_J = \infty$) and $\boldsymbol{\Phi}$ is a logistic CDF. $\mathbf{X}$ in equation (1) is a vector of controls and $\boldsymbol{\gamma}$ is a vector of estimated coefficients. The firm level controls are matched with the employee level controls, so can be controlled at the individual level.

Also, for the ease of interpretation gained from OLS, we estimate the specification above with a simple OLS model as follows:

$$\text{autonomy}_i = \beta_1 \text{fit}_i + \beta_2 \text{fit\_sq}_i + \mathbf{X'}_i\boldsymbol{\gamma} \qquad (2)$$

We estimate equations (1) and (2) using alternative measures for the autonomy and fit. In the both specifications above, β_1 and β_2 account for the effect of the fit quality on the employee's autonomy (aggregate of efficiency and incentive channels) and their sign and statistical significance can imply the overall shape of the effect.

As another test for our theory, this time we take a proxy for the employee's level of motivation in the project and empirically investigate its determinants. We include the measures for fit, autonomy and most importantly, their interaction in an ordered model (equation 3). The estimated coefficient for the interaction- β_3 in the equation (3)- can provide evidence for our theory. More specifically, it can test whether or not, autonomy delegation in poor fit employees, leads to a higher jump in their motivation level comparing good fit employees.

$$\mathbf{P}(\text{motivation}_i = j) = \boldsymbol{\Phi}(\theta_j - \beta_1 \text{fit}_i - \beta_2 \text{autonomy}_i - \beta_3 \text{autonomy}_i * \text{fit}_i - \mathbf{X'}_i\boldsymbol{\gamma}) - \boldsymbol{\Phi}(\theta_{j-1} - \beta_1 \text{fit}_i - \beta_2 \text{autonomy}_i - \beta_3 \text{autonomy}_i * \text{fit}_i - \mathbf{X'}_i\boldsymbol{\gamma}) \quad (3)$$

RESULTS

Table 3, presents the results of the estimates for equation (1) where the dependent variable is the broad measure of autonomy (AUTONOMY). We report the determinants of working autonomy using several specifications. The first three columns show the results of our model using the broad fit measure (FIT) as the main predictor, whereas the second and third three columns use alternative fit measures to check the robustness of our results. We control for the wide set of characteristics of the employee (like gender, age, education, and income) and work (such as firm and project size). Also, all specifications include geographical, technological, and firm fixed

effect controls. The coefficients of the ordered logit model in table 3 can be interpreted as log odds-ratios.[2]

The key variables of interest in table 3 are the fit quality measure. Models (1), (2), and (3) use the broad fit quality measure (FIT and FIT_SQ) as the independent variable. In all three specifications, FIT exerts a significant negative sign while FIT_SQ shows a positive and significant effect on AUTONOMY. The trend is very robust to the inclusion of other controls like employee income and rank in the organization. Also, thorough the next columns (4)-(9) in table 3, other measures of the fit demonstrate an identical effect on the AUTONOMY. All the fit measure negatively and the squared fit measures, positively affects the autonomy, implying a U-shaped relation between autonomy and the fit quality. This is similar to the puzzling trend that we show in figure 1 in the introduction section. Comparing the trend in figure 1 with our results, shows the U-shape relation between autonomy and fit quality, is robust to controlling for various factors and using different measures. The robust U-shape relation underlines our starting point puzzle.

Insert table 3 here

For the ease of interpretation and a simpler check of the minimum point of the U-shape relation, we repeat the estimations of the main specifications of table 3 by OLS (equation 2). The results of OLS estimations show that the coefficients' significance and relative magnitudes are practically similar to the ordered logit analyses. Table 4 reports the OLS estimates for the three fit alternative proxies in our

[2] Since the dependent variable and the main predictor in this study are ordinal responses and do not correspond to real life tangible units, we mainly focus on the statistical significance and the sign of the results rather than their magnitude. Accordingly, we are not reporting the marginal effects, though they are also completely consistent with the rest of our analysis.

study. From the results in table 4, one can simply derive a U-shape outline for the effect of fit on the autonomy. The effect is very similar for all three proxies of the fit. The minimum point of the U-shape is almost in the middle of the range for the fit variable, slightly inclined towards lower fit values which is quite alike the pattern in figure 1. This implies that the full range of the fit variable (between 1-5) is not dominated by a positive slope -which the standard efficiency arguments mat suggest. We interpret this as an evidence for the existence of another channel of delegation, working in the opposite direction of the efficiency channel which we have proposed as the incentive channel.

Insert table 4 here

In the framework of efficiency and incentive channels, the U-shaped relation suggests that firm's face sever motivational challenges when their projects have poor fit quality with the employees skills and experience. Therefore and without expecting efficiency payoffs, offer higher autonomy to incentivize the employee. However, when the fit quality improves, autonomy delegation becomes increasingly efficient to the extent that, although not required to motivate, the firm delegates high job autonomy to the employee. This is our explanation to how employee-employer fit generates a U-shaped effect on the autonomy.

Insert table 5 here

In the next step, we check if this U-shaped effect of fit is also robust to different measures of autonomy. Taking the three alternative measures (AUT1, AUT2, and AUT3) as dependent variables and three alternative measures as the predictor variable (FIT, FIT_EXPER, FIT_KNOW) , we repeat the ordered logit estimations of equation (1). This, generates nine specifications reported in table 5. Columns (1) to (3) report the determinant of autonomy in 'selection of tasks or projects', columns (4) to (6) report the estimates for autonomy in 'allocation

of working time among different tasks or projects' and the last three columns show the estimated coefficients for the autonomy 'in flexibility of working hours'. The results are very similar for all the measures of autonomy and fit, supporting our theoretical argument. In all the specifications, the fit measure enters with a negative significant sign while the squared fit measure always shows a positive and very significant effect. The magnitude of the estimates are also quite comparable, generating the familiar U-shape result. Using alternative estimation models (like ordered probit) also leads to very similar findings and we do not bring them here for saving the space. In general, the robust results of the analysis offer convincing evidence for our theoretical arguments.

Looking at the estimated coefficients of the controls in our analysis also shows interesting results. Gender, never affects an employee's autonomy level significantly. However, employee's age generally relates positively to autonomy delegation. Also, employee's education is significant only when the estimations do not control for income and drops the significance afterwards. This may suggest that the significant effect of education is mainly through proxying for the employee's salary. Employee's autonomy seems also to dependent significantly on the employee's rank in the firm's hierarchy. In our results with the alternative fit measures, employees with higher position in the organization's structure, enjoy higher autonomy levels. The only exception is the case of flexibility in the working hours (columns 7-9 in table 5) which higher ranks negatively relates to autonomy. Our results on the firm size and project (PROJ_SIZE) also suggests that-controlling for the fit quality- employees receive less autonomy in larger firms, however, the bigger projects typically provide higher autonomy levels for the employee.

As mentioned in the data section, we have built our sample from the employees that have at least moved once in their job career. We choose this sample to make use of their previous job experience and knowledge in building our measures of fit. Considering this, there is a sampling bias concern associated with our results. One might argue that the our main findings may only be related to mobile employees. To check the for the potential sampling bias, we use the full sample by adding the employees who have not moved in their career. This, increases our sample size to about 10,000 observations.

The skill measures, in our analysis are only calculated for the mobile employees, since we use their previous job experience and knowledge as a reference. So, the fit values are missing for the non-mobile employees. We first generate a dummy variable indicating mobile employees (MOBILE) . Then, we replace zero instead of the missing fit values for the non-mobile employees and finally, include the modified fit measure together with the mobility dummy in our regression. We run ordered logit models for this specification on the larger sample of mobile and non-mobile employees.

The estimated coefficient of the mobility dummy will suggest if sampling has affected our model and corrects for it. Also, the coefficients of the fit measure, will show if the effect of fit still holds after the correction for the sampling bias or not.

Insert table 6 here

Table 6 reports the results using broad autonomy proxy (AUTONOMY) as the dependent variable. Columns (1) to (3) use three alternative fit measures to check for the sampling bias in our estimates. According to the results, the mobility dummy (MOBILE) is enters the regression with a positive and significant sign, suggesting that mobile employees typically gain more

autonomy in the workplace. Correcting for the effect of mobility, the previous results completely hold for the effect of fit. All the three measures of employee-work fit show strong significance in the larger sample, generating similar U-shaped pattern of effect after correcting for the sampling bias. The magnitude of the effect is also comparable with the results in our main sample. These findings are also confirmed in other models such as OLS and ordered probit, which we do not present for the sake of space saving. Accordingly, we conclude that the presence of incentive channel is not limited to the mobile employees confirming our theoretical arguments.

In all the previous estimations, our analysis investigated the determinants of job autonomy as the dependent variable. As another evidence for our theory, this time we investigate the factors impacting the motivation of the employees in the inventive projects. Table 7 reports the estimation results for the equation (3). Again, the dependent variable (MOTIVATION) has the nature of levels so equation (3) is formulated as an ordered logit model. In columns (1) and (2), like previous estimations, we use a wide range of controls besides our main explanatory variables; FIT, AUTONOMY and most importantly, their interaction. In the specifications in table (7), we first report the model without including the interaction term - column(1) -and then estimate it including the interaction- column (2). This procedure has been repeated for alternative measure of autonomy in the next columns of the table. We have also used alternative measures for the FIT and estimated other combinations, which we do not report here for the sake of space.

In all of the specifications, FIT enters significantly with a positive sign which is quite intuitive and expected. Having a better fit with the project, creates more private benefit for the employee and leads to higher motivation levels. Also as expected, the employee's autonomy - regardless of the measure used- shows positive and highly significant impact. When employees

enjoy higher levels of autonomy in the projects, they can shift their tasks and the direction of R&D towards their preferred targets. So, it is no surprise that higher autonomy generates higher motivation.

Insert table 7 here

The most interesting coefficient of interest though is the interaction between FIT and AUTONOMY. In all the threes specifications which the interaction term is being included - columns (2), (4) and (6)- the coefficient exerts a negative and significant sign. We find this very interesting and meaningful for the message of our paper. The negative interaction term implies that when an employee is poorly fit with her project, delegating more autonomy to her will jump her motivation level much more than the case where the fit is good. This is not a surprise. As explained, when a project does not fit well with an employee's background, she does not take much private benefits from working in it, and therefore, she is not much motivated. So increasing her autonomy can impact her motivation a lot. On the contrary, a good fit employees is already motivated to work in the project which matches his background. So, delegating more autonomy to him, will not change anything much, including his motivation. Therefore, it is natural to see that poorly fit employee's motivation, reacts much more stronger to autonomy delegation. We believe that the results of this estimation is another evidence in support of our theory.

DISCUSSION AND CONCLUSION

The purpose of this study is to theoretically and empirically examine question of to whom and

how much shall the employer delegate autonomy? We begin by noting an empirical puzzle that prior research fails to explain. Our work develops new theoretical explanations and presents new empirical evidence to improve our understanding about the presence and antecedents of autonomy delegation in knowledge intensive activities.

Our key findings that stand out are as follows; we suggest that employers may delegate autonomy for motivation purposes (incentive channel) besides the standard efficiency reasons (efficiency channel) and in the analysis, we find strong empirical evidence in support of this view. Our results confirm the co-existence of both channels of autonomy delegation, showing that the aggregate of the effects depends on the employer-employee fit quality. We believe that the theoretical advancement and empirical findings of the study make important contributions to strategic management research and practice.

Our work underlines the importance of employee-work fit instead of the employee's knowledge or experience per se . The literature traditionally considers employee's knowledge and skill as key factors in work related issues. The best demonstration for this approach is the vast empirical literature which mostly uses the employee's educational degree as a main predictor. Our results highlight that another dimension of the employee's knowledge level which is how instrumental is this knowledge for the objectives of the firm, matters more when making decisions in the work place. We believe bringing the fit into the framework in other areas of strategic human resource management may be promising.

Moreover- and unlike the most previous works- our theoretical framework allows us to address job autonomy at the project-level. We find this important specially with respect to increasing complexity in knowledge intensive activities which may cause employee-employer fit change substantially from one project to another. Therefore, consistent with our setting, firms

may delegate different autonomy levels in different projects to the same employee with respect to her -project relevant- characteristics. Empirically, we expect that this, enables explaining autonomy variations across the projects and within/among firms for the employees.

It is also useful to discuss some limitations of this work. The empirical context of this study is a sample of inventors who have produced a patented innovation. Some might question the generalizability of our findings for non-patenting contexts. However, there is no clear evidence that the mechanisms may differ for non-patenting contexts.

Also, though employing a survey data helps us to acquire directly the measures that we need for the theory, the variables in this case will correspond to the respondents self-estimation of these measures (e.g. perceived autonomy or fit). Although it might be beneficial to combine and check the data with other measures, however, 'there is no systematic evidence that people seriously distort reporting on their job characteristics'(Spenner, 1990).

Finally, in our empirical setting, we only observe the aggregate of two discussed channels. Therefore we cannot empirically examine each channel independently, as we do in the theory. It would be valuable to find other predictors (apart from the fit) which can isolate the two channels as a more reliable test for our theory. For now, this still remains as our future research agenda.

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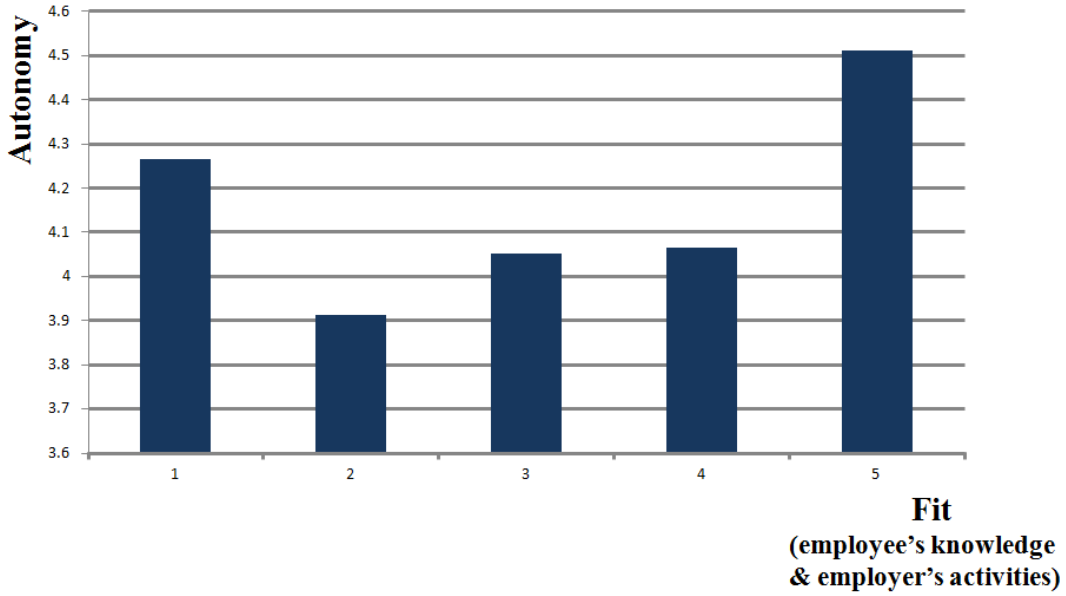

Figure 1. Mean of autonomy levels reported by the employees sorted by the of level of fit between their skill employer's activities (data source: Inno S&T)

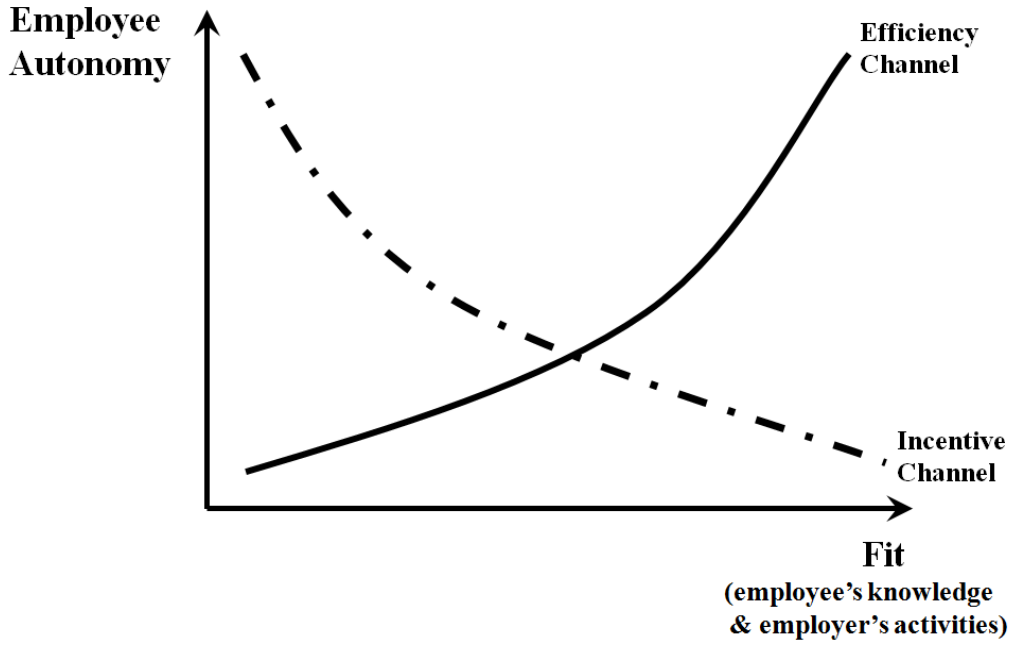

Figure 2. Efficiency and incentive channels of autonomy with respect to the fit

Table 1. Variable Definitions

Vriable		Definition
Autonomy Measures	**autonomy in the selection of tasks (AUT1)**	respondent's score regarding the question on her autonomy level in selection of tasks or projects (b/w 1-6)
	autonomy in time allocation among tasks (AUT2)	respondent's score regarding the question on her autonomy level in allocation of working time among different tasks or projects (b/w 1-6)
	autonomy in selecting working hours (AUT3)	respondent's score regarding the question on her autonomy level in 'flexibility of working hours (b/w 1-6)
	broad autonomy measure (AUTONOMY)	Sum of the variables: **AUTONOMY1, AUTONOMY2, AUTONOMY3** (b/w 3-18)
Fit Measures	**Broad fit measure (FIT)**	respondent's agreement score (b/w 1-5) to the statement: "*... the combination of your previous* experience with the knowledge of your new employer was instrumental in enhancing the inventive activity at the new organization."
	experience fit (FIT_EXP)	respondent's disagreement score (b/w 1-5) to the statement: '...a significant part of your previous inventive experience was no longer *applicable to the new organization's inventive activities*.'
	Knowledge fit (FIT_KNOWLEDGE)	respondent's disagreement score (b/w 1-5) to the statement: '...you had to invest a large proportion of your work time to acquire new technical knowledge to be able to perform your new job.'

Employee's motivation level in the project (MOTIVATION)	respondent's score regarding the question on the importance of intellectual challenge as the motivation for making particular invention (b/w 1-5)
GENDER	Dummy = 1 if the individual is female.
AGE	Age of the individual.
Employee's education (EDU)	Educational degree of the individual: 1= Secondary School or lower; 2= High School Diploma or equivalent; 3= Bachelor or equivalent; 4= Master or equivalent; 5= PhD or equivalent; 6= Post-doctoral degree.
Employee's gross annual income (INCOME)	Individual's approximate annual gross income in the year of the patent application: 1= Below 10,000 Euro; 2= 10,000-29,999 Euro; 3= 30,000-49,999 Euro; 4= 50,000-69,999 Euro; 5= 70,000-99,999 Euro; 6= 100,000 and more Euro
Firm size (SIZE)	Size of the employer firm: 1= 1-9 employees; 2= 10-19 employees; 3= 20-49 employees; 4= 50-99 employees; 5= 100-249 employees; 6= 250-499 employees; 7= 500-999 employees; 8= 1000-4999 employees; 9= 5000 and more employees.
Project man-month (PROJ_SIZE)	Individual's response to the question: "How many man-months did the invention process require in total?" 1= less than 1 man-month; 2=1-3 man-months; 3= 4-6 man-months; 4=7-12 man-months; 5=13-24 man-months; 6=25-48 man-months; 7=49-72 man-months; 8=more than 72 man-months
Employee's rank in firm's hierarchy (RANK)	Individual's rank in the firm's hierarchy, based on the number of people reported to the individual at the time of invention: zero= 0 people; 1= 1-5 people; 2= 6-20; 3= 21 people and more.
Technological Class	ISI-INPI-OST Technology Classes

Table 2 Descriptive statistics and correlation matrix for the main sample of analysis

	Variable	Mean	S.D	Min	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	AUTONOMY	13.47	3.27	3	18														
2	AUT1	4.13	1.53	1	6	0.82													
3	AUT2	4.58	1.29	1	6	0.83	0.58												
4	AUT3	4.78	1.37	1	6	0.70	0.27	0.39											
5	FIT	3.83	1.24	1	5	0.14	0.11	0.12	0.09										
6	FIT_EXPER	3.51	1.48	1	5	0.10	0.08	0.09	0.06	0.23									
7	FIT_KNOW	3.04	1.37	1	5	0.04	0.03	0.04	0.04	0.05	0.39								
8	MOTIVATION	3.84	1.20	1	5	0.14	0.11	0.13	0.09	0.13	0.08	0.00							
9	GENDER	0.04	0.20	0	1	-0.04	-0.02	-0.02	-0.05	-0.03	0.00	-0.03	0.03						
10	AGE	49.96	10.17	17	91	0.21	0.24	0.14	0.09	0.10	0.10	0.11	0.06	-0.11					
11	EDU	3.59	1.16	1	7	0.09	0.06	0.08	0.07	0.02	0.07	0.06	0.03	0.06	0.05				
12	INCOME	4.03	1.19	1	6	0.23	0.19	0.17	0.18	0.08	0.07	0.09	0.03	-0.11	0.36	0.25			
13	RANK	0.88	0.90	0	3	0.13	0.17	0.11	0.01	0.07	0.05	0.05	-0.03	-0.06	0.21	0.11	0.32		
14	SIZE	7.01	2.56	1	10	-0.23	-0.25	-0.18	-0.11	-0.05	-0.05	-0.01	-0.06	0.04	-0.24	0.01	0.04	-0.07	
15	PROJ_SIZE	4.29	2.01	1	9	0.12	0.13	0.10	0.04	0.07	0.09	-0.02	0.09	0.05	0.07	0.12	0.02	0.12	-0.13

Table 3 Ordered logit estimation of the determinants of autonomy using different fit measures

Ordered Logit estimations Dep. var.: **AUTONOMY**	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**
GENDER	-0.100	0.036	0.015	-0.180	-0.075	-0.096	-0.123	0.003	-0.021
	(0.166)	(0.185)	(0.187)	(0.182)	(0.201)	(0.203)	(0.166)	(0.184)	(0.186)
AGE	0.026***	0.015***	0.015***	0.028***	0.017***	0.017***	0.027***	0.016***	0.016***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)	(0.004)	(0.004)	(0.004)
EDU	0.130***	0.041	0.037	0.135***	0.040	0.037	0.127***	0.034	0.031
	(0.033)	(0.035)	(0.036)	(0.035)	(0.038)	(0.039)	(0.034)	(0.036)	(0.037)
PROJ_SIZE	0.055***	0.060***	0.058***	0.050***	0.061***	0.061***	0.060***	0.067***	0.064***
	(0.018)	(0.019)	(0.019)	(0.019)	(0.020)	(0.020)	(0.018)	(0.019)	(0.019)
SIZE	-0.152***	-0.173***	-0.170***	-0.145***	-0.166***	-0.163***	-0.150***	-0.172***	-0.170***
	(0.014)	(0.015)	(0.015)	(0.014)	(0.015)	(0.015)	(0.014)	(0.015)	(0.015)
INCOME		0.297***	0.268***		0.344***	0.319***		0.321***	0.292***
		(0.042)	(0.044)		(0.045)	(0.047)		(0.042)	(0.045)
RANK			0.088**			0.070			0.086*
			(0.044)			(0.047)			(0.045)
FIT	-0.738***	-0.703***	-0.688***						
	(0.157)	(0.165)	(0.168)						
FIT_SQ	0.130***	0.127***	0.123***						
	(0.023)	(0.024)	(0.025)						
FIT_EXPER				-0.504***	-0.509***	-0.533***			
				(0.140)	(0.146)	(0.149)			
FIT_EXPER_SQ				0.094***	0.094***	0.096***			
				(0.022)	(0.023)	(0.023)			
FIT_KNOW							-0.531***	-0.525***	-0.538***
							(0.132)	(0.139)	(0.139)
FIT_KNOW_SQ							0.091***	0.091***	0.091***
							(0.021)	(0.023)	(0.023)
Technology class controls	YES	YES	YES	YES	YES	YES	YES	YES	YES
Geographical controls	YES	YES	YES	YES	YES	YES	YES	YES	YES
Firm fixed effects	YES	YES	YES	YES	YES	YES	YES	YES	YES

Observations	2,892	2,634	2,565	2,618	2,383	2,322	2,867	2,605	2,539
log likelihood	-6761.761	-6115.317	-5946.956	-6108.469	-5518.138	-5367.398	-6719.769	-6067.014	-5901.742
chi-square	473.387	531.630	517.038	425.715	474.585	461.327	422.829	476.200	466.422

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0

Table 4 OLS estimation of the determinants of autonomy using different fit measures

OLS estimations Dep var.: **AUTONOMY**	**(1)**	**(2)**	**(3)**
GENDER	-0.02	-0.15	-0.03
	(0.303)	(0.326)	(0.306)
AGE	0.02***	0.02***	0.02***
	(0.007)	(0.007)	(0.007)
EDU	0.06	0.05	0.04
	(0.059)	(0.062)	(0.061)
SIZE	-0.25***	-0.24***	-0.25***
	(0.022)	(0.023)	(0.023)
PROJ_SIZE	0.11***	0.11***	0.12***
	(0.031)	(0.033)	(0.032)
INCOME	0.45***	0.52***	0.49***
	(0.069)	(0.073)	(0.070)
FIT	-0.88***		
	(0.279)		
FIT_SQ	0.17***		
	(0.041)		
FIT_EXPER		-0.68***	
		(0.249)	
FIT_EXPER_SQ		0.13***	
		(0.038)	
FIT_KNOW			-0.55**
			(0.232)
FIT_KNOW_SQ			0.10***
			(0.038)
Constant	12.92***	12.13***	12.61***
	(0.790)	(0.771)	(0.726)
Observations	2,565	2,322	2,539
R-squared	0.16	0.16	0.15
log likelihood	-6374.41	-5754.17	-6328.37

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 5 Ordered logit estimation of the determinants of autonomy using different autonomy measures

Ordered Logit estimations Dep. var.: **Autonomy in ...**	**AUT1 selection of projects & tasks**			**AUT2 time allocation among tasks**			**AUT3 flexibility of working hours**		
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**
GENDER	0.22	0.11	0.11	0.17	0.11	0.17	-0.28	-0.26	-0.21
	(0.185)	(0.197)	(0.188)	(0.187)	(0.213)	(0.190)	(0.175)	(0.189)	(0.178)
AGE	0.03***	0.03***	0.03***	0.00	0.00	0.00	0.01**	0.01*	0.01*
	(0.004)	(0.005)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)	(0.004)
EDU	0.01	0.02	0.01	0.06	0.06	0.06*	0.03	0.03	0.02
	(0.036)	(0.038)	(0.036)	(0.036)	(0.039)	(0.037)	(0.036)	(0.038)	(0.036)
SIZE	-0.17***	-0.16***	-0.17***	-0.13***	-0.12***	-0.13***	-0.10***	-0.10***	-0.10***
	(0.015)	(0.015)	(0.015)	(0.014)	(0.015)	(0.014)	(0.014)	(0.015)	(0.014)
PROJ_SIZE	0.05***	0.06***	0.06***	0.03	0.04*	0.03	0.04*	0.04**	0.04*
	(0.020)	(0.021)	(0.020)	(0.019)	(0.020)	(0.020)	(0.019)	(0.020)	(0.019)
INCOME	0.21***	0.25***	0.24***	0.21***	0.25***	0.22***	0.22***	0.25***	0.25***
	(0.043)	(0.047)	(0.044)	(0.041)	(0.043)	(0.041)	(0.041)	(0.044)	(0.041)
RANK	0.15***	0.14***	0.16***	0.11**	0.09*	0.11**	-0.10**	-0.12**	-0.12***
	(0.044)	(0.047)	(0.045)	(0.043)	(0.046)	(0.044)	(0.044)	(0.046)	(0.044)
FIT	-0.70***			-0.57***			-0.51***		
	(0.166)			(0.160)			(0.172)		
FIT_SQ	0.12***			0.10***			0.10***		
	(0.025)			(0.024)			(0.025)		
FIT_EXPER		-0.55***			-0.52***			-0.46***	
		(0.154)			(0.149)			(0.148)	
FIT_EXPER_SQ		0.09***			0.09***			0.09***	
		(0.024)			(0.023)			(0.023)	
FIT_KNOW			-0.42***			-0.66***			-0.56***
			(0.140)			(0.139)			(0.145)
FIT_KNOW_SQ			0.06***			0.11***			0.10***
			(0.023)			(0.023)			(0.024)
Technology class controls	YES	YES	YES	YES	YES	YES	YES	YES	YES
Geographical controls	YES	YES	YES	YES	YES	YES	YES	YES	YES
Firm fixed effects	YES	YES	YES	YES	YES	YES	YES	YES	YES

Observations	2,621	2,374	2,595	2,844	2,585	2,819	2,865	2,603	2,838
log likelihood	-4140.30	-3734.27	-4112.21	-4032.88	-3652.76	-4004.42	-4005.26	-3639.67	-3971.28
chi-square	523.17	476.38	492.33	344.92	300.82	329.68	311.65	281.32	282.48

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 6 Ordered logit estimation of the determinants of autonomy for the sample of mobile and non-mobile employees

Ordered Logit estimations Dep. var.: **AUTONOMY**	**(1)**	**(2)**	**(3)**
GENDER	0.01	0.01	0.01
	(0.104)	(0.105)	(0.105)
AGE	0.01***	0.01***	0.01***
	(0.002)	(0.002)	(0.002)
EDU	0.07***	0.07***	0.07***
	(0.019)	(0.019)	(0.019)
SIZE	-0.16***	-0.16***	-0.16***
	(0.010)	(0.010)	(0.010)
PROJ_SIZE	0.05***	0.05***	0.05***
	(0.010)	(0.010)	(0.010)
INCOME	0.30***	0.30***	0.30***
	(0.024)	(0.024)	(0.024)
RANK	0.10***	0.10***	0.10***
	(0.024)	(0.024)	(0.024)
MOBILE	0.56**	0.40*	0.57***
	(0.267)	(0.207)	(0.189)
FIT	-0.67***		
	(0.166)		
FIT_SQ	0.12***		
	(0.024)		
FIT_EXPER		-0.54***	
		(0.146)	
FIT_EXPER_SQ		0.10***	
		(0.023)	
FIT_KNOW			-0.55***
			(0.138)
FIT_KNOW_SQ			0.09***
			(0.023)
Technology class Controls	YES	YES	YES
Geographical Controls	YES	YES	YES
Firm fixed effects	YES	YES	YES
Observations	8,913	8,913	8,913
log likelihood	-21173.00	-21181.14	-21185.19
chi-square	1391.48	1372.14	1352.37

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Table 7 Ordered logit estimation of the determinants of employee's motivation in project

Ordered Logit estimations Dep. Var: **Motivation**	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
GENDER	0.355**	0.349**	0.342**	0.338*	0.366**	0.369**
	(0.175)	(0.175)	(0.173)	(0.173)	(0.167)	(0.167)
AGE	0.010***	0.010**	0.010**	0.010**	0.013***	0.013***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
EDU	0.044	0.042	0.048	0.047	0.049	0.048
	(0.032)	(0.032)	(0.032)	(0.032)	(0.031)	(0.031)
SIZE	0.001	-0.000	0.001	0.000	-0.004	-0.005
	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)
PROJ_SIZE	0.072***	0.072***	0.069***	0.069***	0.077***	0.077***
	(0.018)	(0.018)	(0.018)	(0.018)	(0.017)	(0.017)
INCOME	-0.027	-0.026	-0.015	-0.015	-0.028	-0.026
	(0.034)	(0.033)	(0.033)	(0.033)	(0.032)	(0.032)
RANK	-0.130***	-0.130***	-0.134***	-0.134***	-0.117***	-0.117***
	(0.041)	(0.041)	(0.041)	(0.041)	(0.039)	(0.039)
FIT	0.160***	0.425***	0.162***	0.323***	0.165***	0.396***
	(0.029)	(0.122)	(0.028)	(0.083)	(0.027)	(0.104)
AUTONOMY	0.073***	0.145***				
	(0.012)	(0.035)				
FIT*AUT		-0.019**				
		(0.009)				
AUT1			0.128***	0.273***		
			(0.024)	(0.074)		
FIT*AUT1				-0.038**		
				(0.018)		
AUT2					0.157***	0.341***
					(0.028)	(0.085)
FIT*AUT2						-0.049**
						(0.021)
Constant	2.697***	3.684***	2.253***	2.860***	2.612***	3.471***
	(0.298)	(0.534)	(0.274)	(0.402)	(0.280)	(0.468)
Observations	2,970	2,970	3,033	3,033	3,275	3,275
log likelihood	-3752.712	-3750.205	-3842.670	-3840.523	-4125.998	-4123.359
chi-square	134.959	139.974	120.873	125.168	142.586	147.863

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1