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Do Performance Appraisals Decrease Employees' Perception of their Psychosocial Risks?

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Do Performance Appraisals Decrease Employees' Perception of Their Psychosocial Risks?

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Abstract

This paper uses cross-sectional linked employer-employee data collected from the French Working Conditions Survey, to assess the potential positive or negative effect of performance appraisal interviews administered by firms on employees' reported levels of psychosocial risk. A subjective measure of the psychosocial risks is used and indicates a perceived level of risk. In order to obtain a more objective evaluation, we compare the employees' perceived level of psychosocial risk and the level of risk reported by firms. The results show that the reported levels of psychosocial risk decrease when employees receive performance evaluation reviews on a regular basis; reviews whose effects vary depending on the type of psychosocial risk.

Key words: psychosocial risks, performance appraisal, aggregation methods, propensity score matching, endogenous switching regression.

JEL codes: C43, J28, M54.

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1 Introduction

Working conditions have a significant impact on the production performance of both employees and firms and encompass a wide range of components. A poor working environment deeply affects employees physically, psychologically and/ or socially. The physical risks are well known and have been widely studied. Indeed they include all the physical factors that can affect individuals' physical health or cause an occupational illness and which therefore are addressed as they arise. The question of the psychosocial effects of working conditions is a more recent one; one that has gained attention since the 1950s as a result of increasingly demanding working environments. The most recognizable aspect of psychosocial risk is work-related stress but it also includes violence, harassment, economic insecurities, ethical issues ... The workplace environment, changes in the organization and work management, increasing challenges and firms' managerial policies have an undeniable direct effect on employees' well-being but the psychosocial risks are not only harmful to the welfare of individuals, they also affect firms' productivity.

There is a consensus in the literature that inadequate working conditions are a complex issue that has many medical, psychological, social and economic aspects and implications. The importance of a positive working environment was first highlighted in the fields of psychology and sociology. [Iaffaldano & Muchinsky (1985)] used a meta-analysis of statistical data to show the high correlation between job satisfaction and employee's performance. This meta-analysis gave rise to a variety of new studies ([Warr (1999)], [Martin (2005)]).

In order to better understand occupational stress and psychosocial hazards in general, it is necessary to establish reliable definitions, structured models, and methods of measurement of these risks. Theoretical models have been developed to explain the mechanisms leading to occupational stress; Among them is the "demand-control model" developed by [Karasek (1979)]. The latter defines a job strain situation as being a combination of two factors: high demands and low decision latitude. To these two factors, [Karasek & Theorell (1990)] added a third one: social support, which helps to minimize the negative effects of job strain. This model has been a benchmark in the mapping of occupational stress. Let us also mention the Siegrist "effort-reward model" ([Siegrist (1996)], [Siegrist et al. (2004)]). And more recently, [Bakker & Demerouti (2007)] introduced the "job demands-resources model" as an alternative to those models. In this model, "high job demands" exhaust the mental and physical resources of employees, but in situations where employees have autonomy and receive supervisor feedback and sup-

port, motivation and performance improve. Thus, interactions between job demands and job resources help to buffer job strain.

Scholars in the field of economics have also, more recently, shown interest in the question of well-being in the workplace ([Poggi (2010)]). Examining the relations between working conditions and well-being and performance, earnings and economy in general, [Akerlof & Kranton (2000)] have developed a model of how personal identities and social interactions between individuals shape economic outcomes. [Easterlin (2001)] explores the relationship between subjective well-being and income; [Groot & van den Brink (1999)] analyze the price of occupational stress. Concerning the economic implications of working conditions and job satisfaction on individual's perceived health and well-being, [Robone et al. (2011)] examine the impact of contractual and working conditions on employees' self-assessed physical and mental health, and [Poggi (2010)] focuses on the relation between employees' job satisfaction and aspirations. ([Robone et al. (2011)], [Poggi (2010)]). [Askenazy & Caroli (2010)] and [Dahl (2011)] investigate the impact of work practices and organizational change on employees' health, in France and Denmark, respectively. They find that certain work practices significantly increase stress-related risks. Similarly, [Wooden et al. (2009)] examine the effect of working time mismatch (or mismatch between actual and desired hours of work) on reported levels of job and life satisfaction, and find, inter alia, that it is not the number of hours worked that matters for subjective well-being, but working time mismatch .

The prevalence of the psychosocial issues has given rise to public concern and has prompted various labor and health organizations to provide an overview of the situation worldwide and to define and identify psychosocial hazards in actual situations. In this context, the World Health Organization publication by [Leka & Jain (2010)] focus on the methodology of establishing appropriate risk measures, their estimation and effects on human health. Using a similar approach, the Gollac College of experts, created in France in 2010 ([Gollac (2010)]) addresses the same question, with the aim of identifying the different risk factors implicated, of listing the existing mechanisms of risk monitoring and evaluation and establish a more comprehensive tracking system.

Once identified, psychosocial risk factors must be quantified. This is a difficult task in that it involves measuring psychological states, which by definition are difficult to describe objectively. Different methods have been used to assess overall stress levels. [Bellinghausen & Vaillant (2010)] use Generalized Estimating Equations - which take into account the heterogeneity of the different factors - to estimate overall stress levels. [Bergh et al. (2014)] have

developed a scale to measure psychosocial risk, by calculating the weighted sum of the different risk factors. The weightings are based on experience data derived from previous surveys.

Many aspects of managerial and organizational practices have a direct effect on the well-being of employees and could be potential sources of risk ([Askenazy & Caroli (2010)] and [Dahl (2011)]). [Aziza-Chebil et al. (2015)] question the relation between firms' organizational and structural changes and increasing psychosocial risks employees. This study addresses the question from both employees' and employers' points of view.

Performance appraisal is another important managerial process that has a direct impact on employees' careers and can generate stress. Performance evaluation or appraisal is a process implemented by a company to evaluate and monitor its employees' work performance and as a tool for career development. From an employee's perspective, performance appraisals are a means of improving communication, of developing one's career within the organization and of setting goals, but it is also a source of stress and sometimes injustice. Performance evaluation can be viewed as an incentive to improve the work situation but it can also be an obstacle to the well-being of workers.

Many aspects of the influence of performance evaluation on employees' situations, wages and performance have been investigated. First, [Prendergast & Topel (1993)] address the bias resulting from the fact that interviews do not always make it possible to thoroughly evaluate employee's performance. [Diaye & Greenan (2012)] provide a model of the effects of performance appraisals on employees' levels of effort and wages; and [Diaye et al. (2008)] find, in the French context, that evaluation interviews have a positive impact on productivity and earnings, and help employees gain a better understanding of their working environment. The relationship between management practices and workplace performance has been studied by many scholars, such as [Ramsay et al. (2000)], who address the question using three different conceptual models. Another aspect concerns social relations in the workplace. In a study focusing on Germany and European countries, [Grund & Harbring (2013)] find that monitoring by supervisors is negatively related to employees' trust in their managers and that it also affects the correlation between the existence of a performance appraisal system and individuals' trust in others.

The present analysis examines the relationship between firms' appraisal systems and employees' well-being. In a study on British organizations, [White et al. (2009)] identify a negative - albeit small - effect on the work-life balance of selected high-performance practices such as working hours and

the appraisal system. [Coutrot & Sandret (2015)] obtain different results in a study based on the French statistical survey SUMER and the Karasek model, in which they assess the likelihood of exposure to psychosocial risks under manager supervision, represented by the presence of structured evaluation interviews and of quantified objectives. Their results show that the existence of a structured evaluation decreases the likelihood of being in a job strain situation. This might seem counter-intuitive if we consider that evaluation increases workers' stress. Furthermore, this result could be due to the existence of a perception effect whereby employees have a subjective impression of improvement in their work environment. These results serve as a starting point for our discussion and Coutrot and Sandret's article represents a primary reference for our work.

In this paper, we discuss the ambiguous effect of performance appraisal interviews on employees' psychosocial risk factors; We evaluate employees' perceived effect of evaluation on their situation, and, if possible, provide an objective estimation of this effect, using firm-level information.

The methodology used in this article consists of two estimation methods; propensity score matching and endogenous switching regression on psychosocial risk indicators declared by the employees and constructed using two different aggregation methods. In order to analyze and compare the results, we apply the models, first, to the total population, and then, to a selection of individuals considered highly or weakly exposed to psychosocial risks by their firms; this is done in order to compare firms' and employees' points of view.

2 The Data

The survey "Working Conditions"[1], jointly conducted by the INSEE[2] and the DARES[3], in 2013, provides information on the subject. The survey is a matched employer-employee survey on the organizational, physical, and psychosocial aspects of employees' working conditions. The employee section focuses on a sample of employed individuals aged 15 and over and includes personal data, information about the participants' occupation, physical stress, psychological stress and work organization. A self-administered questionnaire provided a large part of the data on psychosocial constraints.

[1] Conditions de Travail

[2] National Institute of Statistics and Economic Studies - France (Institut National de la Statistique et des Études Économiques - France)

[3] Direction of Animation of Research, Studies and Statistics - France (Direction de l'Animation de la Recherche, des Études et des Statistiques - France)

The firm section targeted a sample of firms and provided information on the characteristics of each company, on their management and work organization, ICT, health and safety management and the percentage of employees exposed to psychosocial risks.

We focused more specifically on commercial companies and on employees who had been employed for at least one year in one of the companies. Thus we obtained a database on 4866 individuals spread over 3226 firms. We use a variable that indicates whether or not a performance appraisal interview system exists in the company, and different variables indicating the existence or not of psychosocial risks for each employee, as perceived by the employee on the one hand, and the firm on the other, and variables related to general information about the firms and employees.

2.1 The Variables

The variables of concern are performance evaluation and the level of psychosocial risks for each employee. The variable EVA is a binary variable that accounts for the existence of a performance evaluation system as reported by employees; it takes value 1 if the employee undergoes at least one performance evaluation interview per year and 0 otherwise. The distribution of this variable indicates that 61% of employees undergo at least one interview every year. Another variable, EVA L accounts for the percentage of employees that are subject to an annual performance interview, as reported by the organization.

The level of psychosocial risk is not quantified by a single measure. An aggregate measure will be constructed using several variables; each variable represents the "yes" or "no" answer by the employee to a question about the presence or not of a particular risk factor. Several well-known theoretical models are used to map the process that leads to the emergence of a situation of "stress" ([Karasek (1979)]; [Karasek & Theorell (1990)]; or [Siegrist (1996)]). Based on these models, the Gollac college of experts ([Gollac (2010)]) provide a 6-dimensional classification of the factors of psychosocial risk: *Dimension 1: work demands - Dimension 2: emotional demands - Dimension 3: autonomy and leeway - Dimension 4: social and work relations - Dimension 5: conflicts of values & Dimension 6: economic insecurity.*

The survey provides various indicators of psychosocial risk. Each variable in the employees' section is a binary variable coded 0 or 1, according to the employee's answer to a "yes" or "no" question concerning a specific risk. A list of these items is constructed. The latter are then catego-

rized into the six dimensions or axis of risks given by Gollac. Two more lists are then compiled using the same variables as in two other papers [Coutrot & Sandret (2015)] and [Aziza-Chebil et al. (2015)]. We do so for reasons of comparability. These different sources are used to construct three indexes of indicators of psychosocial risk - *IND1*, *IND2* and *IND3*, respectively. The first index contains 58 items, the second 17 and the third 38. Note that [Aziza-Chebil et al. (2015)] decided to divide the autonomy and leeway dimension into "skilled" and "non-skilled" labor to account for the difference in the nature of risks. We only use these sub-dimensions in the third index. The lists of items used for each index are provided in appendix 5.1.

For the model concerning the firms' perception of risk, considered, later on, we use variables that correspond to the answer given by each firm to 8 categorical questions (see 5.1.1). These variables indicate the percentage of employees in the company exposed to psychosocial risks. The categories they take are 0%, less than 10%, between 10% and 50% and more than 50%.

Examining each of the many items separately does not allow for a comprehensive examination of the situation. We need to synthesize all these items of information into one indicator or at least a finite number of indicators that can summarize the information and be a meaningful measure of the overall level of psychosocial risk.

2.2 Building a composite index of Psychosocial Risks

Constructing a single index that can fully represent all aspects of psychosocial risks is, without a doubt, a difficult task that cannot be perfectly accomplished unless we accept to lose some information. Moreover, certain factors can interact with each other, and their effects can intensify or compensate each other. Thus, the literature is not unanimous concerning the aggregation method, and so, various methods have been used.

Nonetheless, one intuitive idea consists of summing up the 0/1 - yes/no items to create a measure of intensity, as in the study conducted by [Aziza-Chebil et al. (2015)]. Let us note that in [Coutrot & Sandret (2015)] study the chosen variables and local combinations are studied separately and introduced in a logistic regression.

We choose the summation method to build an indicator of intensity, first by adding the binary variables directly, second by introducing weights to the items before adding them, in order to take into account the correlations between items, at least partially.

2.2.1 Index by summation of items

Let N be the total number of risk variables of interest, N_i, $i = 1..6$ be the number of variables in one specific dimension of the six -dimensional framework mentioned above, and I_{ki} the k^{th} risk variable or item in the i^{th} dimension. Thus, the overall psychosocial risk index is given by:

$$IND\_S = \sum_{k=1}^{N} I_k = \sum_{i=1}^{6} \left(\sum_{k=1}^{N_i} I_{ik} \right)$$

and the indexes in each dimension are given by:

$$IND\_S_i = \sum_{k=1}^{N_i} I_{ik}$$

As noted by [Aziza-Chebil et al. (2015)], this method does not take into account the cumulative effect of the items nor the compensation effect; nor does it account for the heterogeneity of situations, i.e. two individuals with the same scores can be in very different situations.

Using the summation method, and based on the three lists of variables, we create three global indexes, denoted by $IND1\_S$, $IND2\_S$ and $IND3\_S$. For each list, we then create 6 indexes - one for each dimension, except for the third list, which contains 7 dimensions. Thus, we obtain a total of 19 indexes.

Table 1: Distribution of Global Indexes by Summation of Items

	Mean	SD	Min	Max
$IND1\_S$	20,56	7,79	2	47
$IND2\_S$	5,21	3,04	0	15
$IND3\_S$	13,37	4,94	2	30

2.2.2 Construction of weighted index using factor analysis

In order to reduce the problem of interaction between the items, we propose to calculate an index by means of a weighted additive aggregation of all risk items. Several methods of weight determination are available. In [Bergh et al. (2014)] study , which evaluates the number of psychosocial risks in the oil and gas industry sector, the weights of the factors are determined based on their effect on the well-being of employees in an earlier survey. But let us keep in mind that, in our study, weighting is not a measure

of the theoretical importance of each item but intervenes only to correct for overlapping information between two or more correlated indicators.

The method selected is that of factor analysis (FA), as is explained in the "Handbook on Constructing Composite Indicators" by [Nardo et al. (2005)]. The method is applied separately to each dimension (defined by [Gollac (2010)]) and then again to the results, in order to create a global index. Factor analysis is a general method of data analysis related to principal component analysis (PCA). In this case, since the variables are *dichotomous*, FA is performed using the *tetrachoric correlation matrix*. Then, for each dimension c, factorial axis are retained, those who have an associated eigenvalues larger than one and such that their contribution to the global variance is larger than 10% and the sum of their contributions is larger than 60%.A *varimax rotation* is then used to minimize the number of individual indicators that have a high loading on the same factor. The weight of the k^{th} risk item in the i^{th} dimension is estimated by:

$$w_{ik} = \sum_c p_{ikc} \frac{l_{ikc}^2}{\sum_{k=1}^{N_i} l_{ikc}^2}$$

with l_{ikc} the coordinate of I_{ik} on the factorial axis c (after rotation), and p_{ikc} the proportion of variance explained by the factor c relative to the global variance (ie. percentage of eigenvalue). Theses weights satisfy $\sum_{k_i=1}^{N_i} w_{ik} = 1$.
Thus, the index obtained for the dimension i is given by

$$IND\_F_i = \sum_{k=1}^{N_i} w_{ik} I_{ik}$$

and the global index is determined by performing a second FA to the six-dimensional indexes.

$$IND\_F = \sum_{k=1}^{N_i} w_i \; IND\_F_i$$

By applying the weighted summation method to the three lists of variables, we obtain three global indexes, and six indexes per dimension, except in the case of the third list, which contains seven indexes.

Table 2: Distribution of Global Indexes Weighted by FA

	Mean	SD	Min	Max
IND1_F	0,347	0,136	0,034	0,796
IND2_F	0,319	0,187	0,000	0,867
IND3_F	0,375	0,142	0,038	0,854

3 The Model

In order to evaluate the effect of performance evaluations on psychosocial risk, we compare the risk levels as perceived by the different individuals, based on the one or more performance evaluation they undergo each year. We estimate and compare the means of the psychosocial risk indexes for the two groups of employees. For the comparison to be meaningful the two groups need to be identically constituted in terms of characteristics that might affect the variables of interest. However, the two groups are not identically constituted in that the individuals in each group are not similar. Indeed, several parameters related to characteristics of both the employees and the organization determine whether or not the employees undergo evaluation interviews. The differences in the averages of the psychosocial risk indexes, therefore, does not only result from the "causal" effect of evaluation interviews, but also from those characteristics. Thus, there is a *selection bias* in the measurement.

One possible solution for overcoming the selection bias problem is to use the '*Propensity Score Matching*' technique (or PSMatching), a non-parametric method that does not require that any particular relation between the variables be identified explicitly. Another estimation method is the *Endogenous Switching Regression Model* which makes it possible to take into account the observable and unobservable characteristics that affect the variables of interest but imposes a functional restriction between them through a parametric estimation.

In the following sections, we implement each method and interpret and compare their results.

3.1 Propensity Score Matching

The propensity score matching technique, introduced by [Rubin (1974)] and [Rosenbaum & Rubin (1983)] is widely used to estimate the treatment effect on the variable of interest or outcome, by comparing the means of the outcomes of the treated and the control groups, and by taking into account the

bias effect resulting from the difference in their structures. This is done by matching each treated individual to a non-treated person who is observably similar in terms of a function of observable characteristics (the propensity score). The characteristics or control variables X are chosen so that they affect both the treatment variable EVA and the outcome variable IND. The matching technique used in our case is based on "kernel matching" ([Heckman et al. (1998)]).

Depending on the value of EVA_i a potential outcome is defined for *each individual* as :

$$IND_i = \begin{cases} IND_{1i} & if\ EVA_i = 1 \\ IND_{0i} & if\ EVA_i = 0 \end{cases}$$

The causal effect of the treatment is given by $IND_{1i} - IND_{0i}$ though IND_{1i} and IND_{0i} are never observed simultaneously since only one situation is real and the other is hypothetical. The matching allows the creation of a counter-factual for the unobserved group based on the confounding variables and the comparison is shown through the estimation of the average treatment respectively on the treated (ATT) or the untreated (ATU).
Average Treatment effect on the Treated (ATT) :

$$\begin{aligned} ATT &= \mathbb{E}[IND_{1i} - IND_{0i}|EVA_i = 1, p(X_i)] \\ &= \mathbb{E}[IND_{1i}|EVA_i = 1, p(X_i)] - \mathbb{E}[IND_{0i}|EVA_i = 1, p(X_i)] \end{aligned}$$

Average Treatment effect on the Untreated (ATU) :

$$\begin{aligned} ATU &= \mathbb{E}[IND_{1i} - IND_{0i}|EVA_i = 0, p(X_i)] \\ &= \mathbb{E}[IND_{1i}|EVA_i = 0, p(X_i)] - \mathbb{E}[IND_{0i}|EVA_i = 0, p(X_i)] \end{aligned}$$

Where $p(X)$ is the propensity score, it is given by :

$$p(X_i) = \mathbb{E}[EVA_i|X_i] = \mathbb{P}(EVA_i = 1|X_i)$$

Since we look into the effect of the presence of an evaluation interview we are interested on the ATT, then the counter-factual is $\mathbb{E}[IND_{0i}|EVA_i = 1]$.

In fact, the confounding variables must capture all relevant differences between the two groups such that the outcome variables IND are independent of EVA conditional on X. But as X comprises a high number of variables, we replace them with a propensity score, $p(X)$, which must maintain the Conditional Independence, hence,

$$IND_{1i}, IND_{0i} \perp\!\!\!\perp EVA_i \mid p(X_i)$$

The control variables used in this case are (table 3):

Table 3: Statistics on Confounding Variables

Variable	Description	%	Variable	Description	%
GENDER	1. male	56,45	*SENIORITY*	1. $<$ 3 years	15,64
	2. female	43,55		2. 3 - 5 years	11,34
AGE	1. $<$ 25 years	6,82		3. 5 - 10 years	22,77
	2. 25 - 35 years	24,04		4. $>$ 10 years	50,25
	3. 35 - 45 years	31,05	*COMPANY*	1. $<$ 10 employees	3,68
	4. 45 - 55 years	28,42	*_SIZE*	2. 10 - 50 employees	32,47
	5. $>$ 55 years	9,66		3. 50 - 100 employees	14,73
TPP	1. full time	84,71		4. 100 - 250 employees	18,97
	2. part time	15,29		5. 250 - 500 employees	12,06
				6. $>$ 500 employees	18,08

And since we use the propensity score to replace the conditioning by X, we perform a balancing t-test on these co-variates to ensure that the conditional distribution of X given $p(X)$ is independent of EVA. The results (see table 12 appendix 5.2) prove conclusive and the chosen model significantly reduces the bias in the distribution between the matched and unmatched samples in the different models. Furthermore, the common support condition is fulfilled, which implies that for each individual in one group there is an individual in the other group with the same propensity score.

The results of the ATT estimate (and of the naive mean difference without matching) for the six global indexes ($IND1\_S$, $IND1\_S$, $IND2\_S$, $IND2\_F$, $IND3\_F$, $IND3\_F$) and the result for each of the six (or seven) sub-indexes relative to the risk in the different dimensions are given below (tables 4 and 5). Thus, we obtain six estimations that explain the variation in the average level of psychosocial risks by the variable 'evaluation', and 38 models for the same effect on each of the six dimensions.

The results show that the estimated global risk indexes - both naive difference and ATT - reflect a significant decrease in the perceived psychosocial risk level when an evaluation interview system exists. So, in the case of French firms, undergoing a performance evaluation interview decreases the level of risks reported by the employees. This decrease is even more pronounced in the matched estimation than in the naive one. This means that other elements in the underlying situation tend to attenuate the effect of the evaluation interview. The average effect reduction is approximately 14% (between the different global indexes); the highest is given by $IND2\_S$ and $IND2\_F$ and is about 22%, while the lowest is 9% and is given by $IND1\_S$. Furthermore, the lower values of the standard error for weighted

Table 4: Results of PS Matching for Global Indexes

IND1_S	Eval.	No Eval.	**IND1_F**	Eval.	No Eval.
	19,979	21,464		0,338	0,362
Naive	-1,485***		Naive	-0,024***	
	(0,228)			(0,004)	
	19,979	22,516		0,338	0,379
ATT	-2,537***		ATT	-0,041***	
	(0,831)			(0,015)	
IND2_S	Eval.	No Eval.	**IND2_F**	Eval.	No Eval.
	4,807	5,829		0,296	0,356
Naive	-1,022***		Naive	-0,06***	
	(0,088)			(0,005)	
	4,807	6,143		0,296	0,384
ATT	-1,336***		ATT	-0,088***	
	(0,305)			(0,019)	
IND3_S	Eval.	No Eval.	**IND3_F**	Eval.	No Eval.
	13,201	13,639		0,369	0,386
Naive	-0,438***		Naive	-0,017***	
	(0,145)			(0,004)	
	13,201	14,506		0,369	0,408
ATT	-1,306**		ATT	-0,039**	
	(0,541)			(0,016)	

Notes : * : p<0,1 ** : p<0,05 *** : p<0,01
Standard Error in brackets
INDi_j, i=1,2,3 j=S,F index created from variable list i using method j (j=S simple summation, j=F summation using factor analysis weights)

indexes indicate that they provide a more precise estimation. The small differences between weighted and unweighted indexes indicate that there are few interactions between factors in general.

The effect, for each dimension, confirms the tendency of almost all the indexes present a negative mean causal effect i.e. a decrease in the levels of psychosocial risk due to the existence of a performance evaluation system. Concerning dimension 3 (autonomy and leeway), indexes 1,2, and 3 indicate different effects. For indexes 1 and 2, which represent the effect for both skilled and unskilled employees, the results indicate a significant decrease in the level of psychosocial risk when the employees undergo evaluation interviews (especially for index 2. This is may be due to the high number of

Table 5: Results of PS Matching by Dimension

		IND1_S	IND1_F	IND2_S	IND2_F	IND3_S	IND3_F
Dim. 1	Naive	-0,256***	-0,015***	-0,001	0	-0,122**	-0,012**
		(0,094)	(0,006)	(0,032)	(0,011)	(0,062)	(0,006)
	ATT	-0,944***	-0,052***	-0,18*	-0,06*	-0,571**	-0,054**
		(0,342)	(0,02)	(0,109)	(0,036)	(0,23)	(0,021)
Dim. 2	Naive	0,004	0,004	-0,076***	-0,029***	0,085***	0,028***
		(0,059)	(0,007)	(0,026)	(0,009)	(0,027)	(0,009)
	ATT	-0,019	0,005	-0,013	-0,026	-0,075	-0,023
		(0,222)	(0,025)	(0,092)	(0,033)	(0,1)	(0,034)
Dim. 3	Naive	-0,544***	-0,046***	-0,316***	-0,105***	0,204***	0,025***
		(0,071)	(0,006)	(0,027)	(0,009)	(0,05)	(0,005)
	ATT	-0,732***	-0,061***	-0,46***	-0,153***	0,039	0,011
		(0,244)	(0,022)	(0,097)	(0,032)	(0,178)	(0,02)
Dim. 31	Naive					-0,169***	-0,056***
						(0,023)	(0,008)
	ATT					-0,199**	-0,066**
						(0,085)	(0,028)
Dim. 4	Naive	-0,426***	-0,038***	-0,263***	-0,088***	-0,094***	-0,016***
		(0,056)	(0,005)	(0,024)	(0,008)	(0,029)	(0,006)
	ATT	-0,453**	-0,04**	-0,139	-0,046	-0,062	-0,007
		(0,202)	(0,018)	(0,092)	(0,031)	(0,108)	(0,022)
Dim. 5	Naive	-0,21***	-0,036***	-0,28***	-0,093***	-0,254***	-0,06***
		(0,04)	(0,007)	(0,03)	(0,01)	(0,035)	(0,009)
	ATT	-0,227	-0,04*	-0,441***	-0,147***	-0,335***	-0,071**
		(0,145)	(0,024)	(0,108)	(0,036)	(0,126)	(0,032)
Dim. 6	Naive	-0,054**	-0,013**	-0,087***	-0,044***	-0,088***	-0,044***
		(0,027)	(0,007)	(0,013)	(0,006)	(0,013)	(0,006)
	ATT	-0,162*	-0,041*	-0,102**	-0,051**	-0,103**	-0,051**
		(0,096)	(0,024)	(0,048)	(0,024)	(0,048)	(0,024)

Notes : * : p<0,1 ** : p<0,05 *** : p<0,01
Standard Error in brackets
INDi_j, i=1,2,3 j=S,F index created from variable list i using method j (j=S simple summation, j=F summation using factor analysis weights)
Dim. 1 : work demands - Dim. 2 : emotional demands - Dim. 3 : autonomy and leeway - Dim. 4 : social and work relations - Dim. : conflicts of values - Dim. 6 : economic insecurity

variables in index 1, which can create offsetting effects). For index 3, the effect is divided into two categories: The effects of performance appraisals on the levels of psychosocial risks for unskilled workers on the one hand, and on the skilled workers on the other. The effect is positive for the first category but significantly negative for the second. This is due to the fact that qualified workers have more responsibilities and managerial functions, which performance evaluations can help them fulfill. Dimension 3, as well

as dimensions 5 and 6 (conflict of values and economic insecurities respectively), present the most significant and important decrease in psychosocial risk for all indexes. These dimensions are the most affected by the effect examined for the six indexes. With regards to the other dimensions, we note that dimension 1 (work demand or work intensity) has a mild decreasing effect on the risk levels, while dimensions 2 and 4 (resp. emotional demand and social and work relations) have, on the whole, no significant effect and dimension 4 has only a mildly significant decrease for index 1.

3.2 Endogenous Switching Regression

The second method consists of estimating an endogenous switching regression model, which is a parametric regression model in which the dependent variable for each individual can be determined by one of two regimes depending on a selection, or switching equation. [Maddala & Nelson (1975)] and [Maddala (1983)] noted the importance of this model for studying truncated and qualitative dependent variables in a variety of settings such as labour economics ([Lee (1978)], [Adamchik & Bedi (2000)]), housing demand modelling ([Trost (1977)])... It also provides a solution to the selection bias problem and makes it possible to specify a full model for pertinent observable and unobservable characteristics. This model uses a maximum likelihood estimation which simultaneously fits the outcome equation and the selection equation.

So, for every individual i let the binary variable EVA_i be the dependent variable of the selection equation. Then, depending on the outcome of this regression, individual i faces two regimes: one if he undergoes a yearly evaluation interview that gives him a certain level of psychosocial risks, IND_{1i}; or a second regime - if he does not undergo any evaluation interview - associated with level IND_{2i}

Therefore, for each individual i, the regression model is as follows :

$$\begin{array}{l} EVA_i = \left\{ \begin{array}{ll} 1 & \text{if } EVA_i^* = Z_i\gamma + u_i > 0 \\ 0 & \text{otherwise} \end{array} \right. \\ IND_{1i} = X_{1i}\beta_1 + \varepsilon_{1i} \text{ if } EVA_i = 1 \\ IND_{2i} = X_{2i}\beta_2 + \varepsilon_{2i} \text{ if } EVA_i = 0 \end{array} \tag{1}$$

Where Z_i are explanatory variables of the selection equation; they explain the conditions that qualify an employee for an evaluation interview.
X_{1i} and X_{2i} are explanatory variables that explain the level of risk on each regime. X_{1i} and X_{2i} can be identical or different. Furthermore, some exogenous variables can be used both in Z_i and X_{ki}.

For purposes of identification, the selection equation must, in addition to the explanatory variables, contain an *exclusion variable*, which is a variable that only affects EVA and not IND. The selection variable therefore only affects the assignment to a particular regime.

In our particular case, the exclusion variable is $ESOP$ (existence of an employee stock ownership program in the company). We believe that when both a financial participation program and a performance evaluation system exist in one firm, the two must be correlated since they both characterize the firm's management policy. However, financial participation does not affect the work environment, and is not expected to affect the psychosocial well-being of employees.

Using the above model, we can estimate the regressions as well as the average effects of treatment in the forms of the ATT and the ATU using the estimated coefficients of the different regressions :

$$\begin{aligned} ATT &= \mathbb{E}[IND_{1i}|EVA_i = 1, X_{1i}] - \mathbb{E}[IND_{2i}|EVA_i = 1, X_{2i}] \\ &= X_{1i}\beta_1 + \sigma_1\rho_1\tfrac{f(\gamma Z_i)}{F(\gamma Z_i)} - X_{2i}\beta_1 - \sigma_2\rho_2\tfrac{f(\gamma Z_i)}{F(\gamma Z_i)} \\ ATU &= \mathbb{E}[IND_{1i}|EVA_i = 0, X_{1i}] - \mathbb{E}[IND_{2i}|EVA_i = 0, X_{2i}] \\ &= X_{1i}\beta_2 - \sigma_1\rho_1\tfrac{f(\gamma Z_i)}{(1-F(\gamma Z_i))} - X_{2i}\beta_2 + \sigma_2\rho_2\tfrac{f(\gamma Z_i)}{(1-F(\gamma Z_i))} \end{aligned}$$

where σ_1 and σ_2 are variances of the error terms in the two regime equations; ρ_1 and ρ_2 are the coefficient of correlation between ε_k and u $(k = 1, 2)$.

The ATT represents the difference between the mean perceived psychosocial risk level according to the first and second regime for individuals who underwent an evaluation interview. Thus it estimates the effect of evaluation on the level of psychosocial risk as perceived by the employees who actually underwent an evaluation. The ATU is interpreted in the same manner.

The following table (6) presents the control variables used for the two regimes and the selection equation (the selection equation also includes the exclusion variable $ESOP$):

Table 6: Definition of Control Variables

Variable	Description	%
GENDER	1. male	43,55
	2. female	56,45
COUPLE	1. couple	27,46
	2. not couple	72,54
SEC	1. executives	19,21
	2. middle managements	28,77
	3. clerks	22,07
	4. blue collars	29,94
TPP	1. full time	15,29
	2. part time	84,71
ACTV	2. industry	30,07
	3. construction	6,6
	4. transportation	7,83
	5. trade	16,4
	6. service	39,11
ESOP	1. employee stock ownership plan	53,68
	0. no	46,32
Variable	Description	Mean
L.AGE	Log of the age	3,69
L.SENIORITY	Log of number of seniority years	2,10
L.COMPAGNY_SIZE	Log of the company size	4,69

Results of the estimations for the ATT and ATU are presented in tables 7 and 8. The detailed results of the regressions are provided in appendix 5.3.

According to the formula, the ATT (resp. ATU) expresses the difference between the expected values of the risk index estimated when the equation of regime 1 is used (resp. regime 2) and the expected risk when the equation of regime 2 is used (resp. regime 1), bearing in mind that the individual belongs to the group of employees that undergo an evaluation interview. We are primarily interested in the ATT since it explains the effect caused by the existence of an evaluation interview system on the levels of psychosocial risk for the employees who have been evaluated.

Note that the results of the endogenous switching regression estimates for global indexes of the ATT and ATU are all significant. And the ATT differences for all global indicators take negative values, which means that the perceived intensity of psychosocial risk decreases when employees undergo a performance evaluation interview. These results are consistent with PS matching results in the previous section. The ATU effect is mostly positive, except for index 2. For the employees who do not go undergo performance appraisals, the perceived psychological risk level does not decrease, which

Table 7: Results of Endogenous Switching Regression for the Global Indexes

IND1_S	Y11	Y21	**IND1_F**	Y11	Y21
	19,980	21,821		0,338	0,379
ATT	-1,841***		ATT	-0,041***	
	(0,041)			(0,001)	
	Y21	Y22		Y21	Y22
	22,875	21,464		0,387	0,362
ATU	1,41***		ATU	0,025***	
	(0,047)			(0,001)	

IND2_S	Y11	Y21	**IND2_F**	Y11	Y21
	4,807	6,048		0,296	0,368
ATT	-1,242***		ATT	-0,072***	
	(0,016)			(0,001)	
	Y21	Y22		Y21	Y22
	5,455	5,829		0,341	0,356
ATU	-0,374***		ATU	-0,014***	
	(0,018)			(0,001)	

IND3_S	Y11	Y21	**IND3_F**	Y11	Y21
	13,201	13,679		0,369	0,384
ATT	-0,478***		ATT	-0,015***	
	(0,031)			(0,001)	
	Y21	Y22		Y21	Y22
	15,382	13,639		0,429	0,386
ATU	1,744***		ATU	0,043***	
	(0,041)			(0,001)	

Notes : * : p<0,1 ** : p<0,05 *** : p<0,01
Standard Error in brackets
INDi_j, i=1,2,3 j=S,F index created from variable list i using method j (j=S simple summation, j=F summation using factor analysis weights)
$Y_{kl},\ k,l = 1,2$ denote the expectancies used to calculate ATT and ATU : $Y_{kl} = \mathbb{E}[IND|EVA = k, X_l]$.

suggests that the effect is not clearly perceived by the employees whose performance have not been evaluated.

Furthermore, the results per dimension indicate various effects, but we

Table 8: Results of Endogenous Switching Regression by Dimension

		IND1_S	IND1_F	IND2_S	IND2_F	IND3_S	IND3_F
Dim. 1	ATT	-0,466***	-0,021***	0,194***	0,065***	-0,44***	-0,042***
		(0,013)	(0,001)	(0,003)	(0,001)	(0,014)	(0,001)
	ATU	0,989***	0,057***	0,257***	0,086***	0,681***	0,064***
		(0,018)	(0,001)	(0,004)	(0,001)	(0,019)	(0,002)
Dim. 2	ATT	-0,849***	-0,1***	-0,159***	-0,039***	-2,586 **(NS)**	0,013***
		(0,014)	(0,002)	(0,005)	(0,001)	(0,004)	(0,002)
	ATU	-0,987***	-0,127***	-0,125***	-0,036***	2,885 **(NS)**	0,112***
		(0,019)	(0,002)	(0,007)	(0,002)	(0,017)	(0,002)
Dim. 3	ATT	0,534***	0,061***	-0,263***	-0,088***	0,999***	0,1***
		(0,031)	(0,003)	(0,012)	(0,004)	(0,012)	(0,001)
	ATU	0,622***	0,062***	-0,013	-0,004	1,075***	0,122***
		(0,037)	(0,003)	(0,013)	(0,004)	(0,015)	(0,002)
Dim. 31	ATT					-0,109***	-0,036***
						(0,003)	(0,001)
	ATU					0,155***	0,052***
						(0,004)	(0,001)
Dim. 4	ATT	-0,625***	-0,067***	1,84 **(NS)**	0,614 **(NS)**	-0,406***	-0,088***
		(0,007)	(0,001)	(0,002)	(0,001)	(0,005)	(0,001)
	ATU	-0,271***	-0,025***	-1,689 **(NS)**	-0,563 **(NS)**	-0,222***	-0,039***
		(0,009)	(0,001)	(0,003)	(0,001)	(0,006)	(0,001)
Dim. 5	ATT	0,1***	0,01***	-0,336***	-0,112***	-0,004	0,02***
		(0,005)	(0,001)	(0,004)	(0,001)	(0,006)	(0,001)
	ATU	0,142***	0,02***	-0,098***	-0,033***	-0,043***	-0,01***
		(0,006)	(0,001)	(0,004)	(0,001)	(0,007)	(0,002)
Dim. 6	ATT	-0,381***	-0,095***	-0,278***	-0,139***	-0,281***	-0,14***
		(0,004)	(0,001)	(0,001)	(0,001)	(0,001)	(0,001)
	ATU	0,167***	0,042***	-0,086***	-0,043***	-0,083***	-0,041***
		(0,005)	(0,001)	(0,002)	(0,001)	(0,002)	(0,001)

* : p<0,1 ** : p<0,05 *** : p<0,01 (in brackets) : Standard Error **(NS)** : non significant

Notes : * : p<0,1 ** : p<0,05 *** : p<0,01
Standard Error in brackets
INDi_j, i=1,2,3 j=S,F index created from variable list i using method j (j=S simple summation, j=F summation using factor analysis weights)
$Y_{kl},\ k,l = 1,2$ denote the expectancies used to calculate ATT and ATU : $Y_{kl} = \mathbb{E}[IND|EVA = k, X_l]$.
Dim. 1 : work demands - Dim. 2 : emotional demands - Dim. 3 : autonomy and leeway - Dim. 4 : social and work relations - Dim. : conflicts of values - Dim. 6 : economic insecurity

find an overall negative ATT tendency. All the indexes for dimension 6 (economic insecurity) indicate the largest decrease in psychosocial risk, followed by those of dimension 3 (autonomy and leeway). But here again, the decline is recorded by the indexes of lists 1 and 2. For the indexes of list 3, which have 2 components (Dim3 for the unqualified staff, and Dim31 for qualified staff), it is the second category that gives a high negative ATT. Thus, evaluation interviews affect the qualified staff and not the unqualified staff. We also observe a marked reduction of psychosocial risk levels associated with

performance evaluations in dimension 4 (social and work relations), except for index 2, in which the results are non-significant. In fact, social relations at work are largely discussed in performance interviews. Otherwise, ATT differences remain low or insignificant in dimensions 1, 2 and 5.

3.3 Psychosocial Risks as perceived by firms

The previous sections focus on the workers' perceptions of their own psychosocial well-being depending on whether or not they undergo appraisal interviews annually. However, the results do not indicate whether the changes in the level of reported psychosocial risk correspond to real improvements in the working conditions and environment, or whether they, in fact, correspond to the employees' perceptions of the effects of the evaluation interviews. Thus, we raise the question of whether performance evaluations actually have the potential to really improve the quality of the work environment, or whether the perception of improvement in the work environment is an impression due to a positive psychological effect created by interviews.

Thus, we examine the same variations in psychosocial risks as perceived by firms. This allows for a more realistic view of the effect. To only take into account the employees' perception could lead to more subjective results, in that the workers' perception might be influenced by psychological effects caused by the interviews they undergo.

In practice, the indicators provided by the companies indicate the risk level in the organization as a whole, and not for employees, individually. Each firm indicates the percentage of the employees affected by psychosocial risk. This data cannot, therefore, be used to measure the risk affecting individuals. In order to extract data that can be used to measure the risks at the individual level, we aggregate the firms' indicators into a composite index using the summation method. We then classify the employees according to this index and extract 2 groups; The first group comprises the employees with the highest values of this index and the second group is that of the employees with the lowest values. The firms' psychosocial indicators are given in appendix 5.1.1. This should yield two groups of employees; one comprised of employees working in an environment in which they are exposed to high levels of psychosocial risk and a second group of employees for whom the level of risk is low.

Let us consider the subsets comprising the 10% and 25% of employees, who according to the organization, are the most exposed to psychosocial risks, and the subsets comprising the 10% and 25% least exposed individuals. By applying propensity score matching and an Endogenous Switching

regression on these particular populations, we obtain results that are specific to them. Indeed, by considering the most affected populations, if the company declares that its employees are highly exposed to psychosocial risk, while the employees themselves report a reduction of the psychosocial risk due to the evaluation interviews. We, therefore, can say that at least one component of this decline in psychosocial risk is due to an effect of the employees' subjective perception.

The PS Matching results, presented in tables 9 and 10, indicate overall negative ATT values, but not all are significant. For index 2 ($IND2\_S$ and $IND2\_F$), for the 10% most exposed employees, we note a 15% decrease in the index, on average, when the employee undergoes an evaluation interview. A 12% decline is observed for the 25% most exposed employees. For the endogenous switching regression, results indicated negative and significant ATT differences for the sample of 10% and 25% most exposed workers. For index 3 ($IND3\_S$ and $IND3\_$), for the 25% most exposed employees, the variation in the risk index is positive but the increase is very low. The results for the 10% and 25% least exposed individuals are contradictory.

By examining the results provided by the companies concerning the employees most exposed to psychosocial risk, we find that the changes that are attributable to the perception of employees are opposite to the changes reported by the organization. Consequently, we can confirm that the improvement in the working conditions reported by the employees can be attributed to a perception effect. Evaluation interviews have no tangible effect on working conditions, or, if they do have an effect, it is not as important as the employees perceive it to be.

Table 9: PS Matching for the Most and Least Exposed

		IND1_S	IND1_F	IND2_S	IND2_F	IND3_S	IND3_F
10%+	Naive	-1,103	-0,02	-1,112***	-0,06***	-0,237	-0,008
		(0,912)	(0,016)	(0,349)	(0,021)	(0,551)	(0,016)
	ATT	-1,018	-0,025	-0,951*	-0,05	-0,371	-0,01
		(1,562)	(0,028)	(0,588)	(0,036)	(0,996)	(0,029)
10%-	Naive	-1,873**	-0,034**	-1,2***	-0,072***	-0,641	-0,03*
		(0,868)	(0,015)	(0,338)	(0,021)	(0,541)	(0,015)
	ATT	-0,089	-0,003	-0,786	-0,039	0,741	0,01
		(1,332)	(0,022)	(0,497)	(0,03)	(0,8)	(0,023)
25%+	Naive	-1,261**	-0,022**	-1***	-0,053***	-0,313	-0,01
		(0,586)	(0,01)	(0,225)	(0,014)	(0,36)	(0,01)
	ATT	-0,914	-0,018	-0,748*	-0,041	-0,489	-0,009
		(1,132)	(0,02)	(0,406)	(0,025)	(0,729)	(0,021)
25%-	Naive	-1,378***	-0,023**	-1,035***	-0,061***	-0,313	-0,017*
		(0,52)	(0,009)	(0,206)	(0,013)	(0,335)	(0,01)
	ATT	-0,905	-0,016	-0,764*	-0,04	0,221	-0,003
		(1,011)	(0,017)	(0,403)	(0,025)	(0,643)	(0,018)

Notes : * : p<0,1 ** : p<0,05 *** : p<0,01 Standard Error in brackets
INDi_j, i=1,2,3 j=S,F index created from variable list i using method j (j=S simple summation, j=F summation using factor analysis weights)
x%+ (resp. x%-) the population of x% the most (resp.least) affected by psychosocial risks according to firms.

Table 10: Endogenous Switching Regression for the Most and Least Exposed

		IND1_S	IND1_F	IND2_S	IND2_F	IND3_S	IND3_F
10%+	ATT	-0,762**	-0,05***	-1,931***	-0,151***	-0,41**	-0,039***
		(0,314)	(0,006)	(0,129)	(0,008)	(0,187)	(0,006)
	ATU	-12,188***	-0,222***	-6,078***	-0,29***	-0,804***	-0,142***
		(0,385)	(0,007)	(0,152)	(0,009)	(0,27)	(0,008)
10%-	ATT	-5,056***	-0,107***	6,282 **(NS)**	0,39 **(NS)**	0,721***	0,118***
		(0,335)	(0,006)	(0,135)	(0,008)	(0,238)	(0,007)
	ATU	0,556**	0,006	0,204 **(NS)**	0,008 **(NS)**	0,742***	-0,004
		(0,234)	(0,004)	(0,087)	(0,005)	(0,156)	(0,004)
25%+	ATT	-1,343***	-0,017***	-1,766***	-0,117***	0,241***	0,004*
		(0,12)	(0,002)	(0,043)	(0,003)	(0,079)	(0,002)
	ATU	1,598***	0,003	-0,246***	-0,016***	1,944***	0,055***
		(0,174)	(0,003)	(0,054)	(0,003)	(0,134)	(0,004)
25%-	ATT	-4,463***	-0,084***	6,087***	-0,148***	-0,64***	-0,021***
		(0,143)	(0,002)	(0,056)	(0,003)	(0,11)	(0,003)
	ATU	2,118***	0,031***	-0,118**	-0,041***	0,793***	0,014***
		(0,121)	(0,002)	(0,049)	(0,003)	(0,093)	(0,003)

Notes : * : p<0,1 ** : p<0,05 *** : p<0,01 Standard Error in brackets
INDi_j, i=1,2,3 j=S,F index created from variable list i using method j (j=S simple summation, j=F summation using factor analysis weights)
x%+ (resp. x%-) the population of x% the most (resp.least) affected by psychosocial risks according to firms.

4 Conclusion

This study highlights the effects of yearly performance evaluations on the psychosocial conditions of employees. It provides empirical evidence, in the French context, of changes in reported psychosocial risk levels occurring when employees undergo performance evaluation interviews at least once a year. This effect is viewed in two different ways: the effect as perceived by the employees and the effect as reported by the firms. In this paper, we consider the point of view of the employees and compare it with that of the companies.

If these changes are real and not merely perceived, they affect both employees and firms. Evaluation interviews are a management tool aimed at encouraging employees to improve performance and productivity. Therefore, if, in practice, evaluation interviews do increase psychosocial risks, they will then prevent the organization from reaching its objectives.

The main contribution of our study is to show that employees' perceived psychosocial risk levels decrease if they undergo an evaluation process at least once a year. This confirms the results of [Coutrot & Sandret (2015)], who also find that employees who undergo performance reviews generally report lower exposure to psychosocial risks. This effect can be divided into effects into various risk dimensions. The study shows that performance reviews have a positive and significant effect on the autonomy of skilled employees (i.e. more autonomy in decision making and in they way they perform their tasks). Moreover, economic insecurity also decreases and employees have a more positive vision of their future when they are employed by firms that have a performance appraisal system. This may be the result of improved support from management or colleagues and better communication.

The second contribution of this study is to distinguish the point of view of the employees from that of firms. In this regard, the difficulty lies in the fact that there is no precise objective measurement of psychosocial risk since it is a phenomenon that can only be described by the person who is exposed to it. By comparing the results reported by employees and those reported by companies, we find that employees perceive that their working conditions improve, while their companies report that a significant percentage of their employees are exposed to high levels of risk. [Aziza-Chebil et al. (2015)] find similar results when examining the effect of organizational changes on psychosocial risks.

This result confirms the idea that these effects are felt, particularly at the employee level, and that they are, for the most part, attributable to perception. On the other hand, the motivation resulting from employees' performance evaluations certainly has real, positive impacts on the employ-

ees, but they are limited. Furthermore, this study does not in any way support the idea that performance evaluation deteriorates the psychosocial conditions of employees.

References

[Adamchik & Bedi (2000)] Adamchik V. A., and Bedi, A. S. (2000). Wage differentials between the public and the private sectors: Evidence from an economy in transition. em Labour economics, 7(2), 203-224.

[Akerlof & Kranton (2000)] Akerlof, G. A., and Kranton, R. E. (2000). Economics and identity. *Quarterly Journal of Economics*,115(3), 715-753.

[Askenazy & Caroli (2010)] Askenazy, P., and Caroli, E. (2010). Innovative work practices, information technologies and working conditions: evidence for France. *Industrial Relations: A Journal of Economy and Society*, 49(4), 544-565.

[Aziza-Chebil et al. (2015)] Aziza-Chebil A., Diaye M.-A. and Delattre E. (2015). Les changements organisationnels augmentent-ils les risques psychosociaux des salariés ? : Une analyse sur données couplées. *forthcoming in Economie et Prévision.*

[Bakker & Demerouti (2007)] Bakker, A. B., and Demerouti, E. (2007). The job demands-resources model: State of the art. *Journal of Managerial Psychology*, 22(3), 309-328.

[Bellinghausen & Vaillant (2010)] Bellinghausen L. and Vaillant N. (2010). Les déterminants du stress professionnel ressenti: Une estimation par la méthode des équations d'estimation généralisées. *Economie et Prévision*, 195-196, 67-82.

[Bergh et al. (2014)] Bergh L.I.V., Hinna S., Leka S., and Jain A. (2014). Developing a performance indicator for psychosocial risk in the oil and gas industry. *Safety science*, 62, 98-106.

[Coutrot & Sandret (2015)] Coutrot T. and Sandret N. (2015). Pilotage du travail et risques psychosociaux. *Dares Analyses*, 003.

[Dahl (2011)] Dahl, M. S. (2011). Organizational change and employee stress. *Management Science*, 57(2), 240-256.

[Diaye & Greenan (2012)] Diaye M.A., and Greenan N. (2012). The Economics of Performance Appraisals.

[Diaye et al. (2008)] Diaye M.A., Greenan N., and Urdanivia M.W. (2008). Subjective evaluation of performance and evaluation interview: Empirical evidence from France. *In The Analysis of Firms and Employees: Quantitative and Qualitative Approaches*, University of Chicago Press, 107-131.

[Easterlin (2001)] Easterlin, R. A. (2001). Income and happiness: Towards a unified theory. *The Economic Journal*, 111(473), 465-484.

[Grund & Harbring (2013)] Grund, C., and Harbring, C. (2013). Trust and Control at the Workplace. *Jahrbücher für Nationalökonomie und Statistik (Journal of Economics and Statistics)*, 233(5-6), 619-637.

[Gollac (2010)] Gollac M. (2010). Mesurer les facteurs psychosociaux de risques au travail pour les maîtriser. *Rapport du collège d'expertise sur le suivi des risques psychosociaux au travail, faisant suite à la demande du Ministre du travail, de l'emploi et de la santé.*.

[Groot & van den Brink (1999)] Groot, W., and van den Brink, H. M. (1999). The price of stress. *Journal of Economic Psychology*, 20(1), 83-103.

[Heckman et al. (1998)] Heckman J.J., Ichimura H. and Todd P. (1998). Matching as an econometric evaluation estimator. *The Review of Economic Studies*, 65(2), 261-294.

[Iaffaldano & Muchinsky (1985)] Iaffaldano, M. T., and Muchinsky, P. M. (1985). Job satisfaction and job performance: A meta-analysis. *Psychological Bulletin*, 97(2), 251.

[Karasek (1979)] Karasek Jr, R. A. (1979). Job demands, job decision latitude, and mental strain: Implications for job redesign. *Administrative Science Quarterly*, 285-308.

[Karasek & Theorell (1990)] Karasek R. A. and Theorell T. (1990). Healthy Work: stress, productivity, and the reconstruction of the working life, *Basic Books, New York*.

[Lee (1978)] Lee L.F. (1978). Unionism and wage rates: A simultaneous equations model with qualitative and limited dependent variables. *International Economic Review*, 19, 415-433.

[Leka & Jain (2010)] Leka, S., and Jain, A. (2010). Health impact of psychosocial hazards at work: an overview. *World Health Organization*, Geneva.

[Lokshin & Sajaia (2004)] Lokshin M., and Sajaia Z. (2004). Maximum likelihood estimation of endogenous switching regression models. *Stata Journal*, 4, 282-289.

[Maddala & Nelson (1975)] Maddala G.S. and Nelson F.D. (1975). Specification errors in limited dependent variable models. *Working Paper, Cambridge, MA: NBER*, No. w0096.

[Maddala (1983)] Maddala G.S. (1983). Limited-dependent Variables and Qualitative Variables in Economics. *New York: Cambridge University Press*.

[Martin (2005)] Martin, A. J. (2005). The role of positive psychology in enhancing satisfaction, motivation, and productivity in the workplace. *Journal of Organizational Behavior Management*, 24(1-2), 113-133.

[Nardo et al. (2005)] Nardo M., Saisana M., Saltelli A., Tarantola S., Hoffman A. and Giovannini E. (2005). Handbook on Constructing Composite Indicators: Methodology and User Guide. *OECD Statistics Working Papers, OECD Publishing*, 2005/03.

[Prendergast & Topel (1993)] Prendergast, C., and Topel, R. (1993). Discretion and bias in performance evaluation. *European Economic Review*, 37(2-3), 355-365.

[Poggi (2010)] Poggi, A. (2010). Job satisfaction, working conditions and aspirations. *Journal of Economic Psychology*, 31(6), 936-949.

[Ramsay et al. (2000)] Ramsay H., Scholarios D. and Harley B. (2000). Employees and high-performance work systems: testing inside the black box. *British Journal of Industrial Relations*, 38(4), 501-531.

[Robone et al. (2011)] Robone S., Jones A. M., and Rice N. (2011). Contractual conditions, working conditions and their impact on health and well-being. *The European Journal of Health Economics*, 12(5), 429-444.

[Rosenbaum & Rubin (1983)] Rosenbaum P.R. and Rubin D.B. (1983). The central role of the propensity score in observational studies for causal effects. *Biometrika*, 70(1), 41-55.

[Rubin (1974)] Rubin D. B. (1974). Estimating causal effects of treatments in randomized and nonrandomized studies. *Journal of Educational Psychology*, 66(5), 688.

[Siegrist (1996)] Siegrist J. (1996). Adverse health effects of high-effort/low-reward conditions. *Journal of Occupational Health Psychology*, 1(4), 27-41.

[Siegrist et al. (2004)] Siegrist J., Starke D., Chandola T., Godin I., Marmot M., Niedhammer I., and Peter R. (2004). The measurement of effort-reward imbalance at work: European comparisons. *Social Science & Medicine*, 58(8), 1483-1499.

[Trost (1977)] Trost R.P. (1977). Demand for housing: A model based on inter-related choices between owning and renting. *Unpublished Ph. D dissertation, University of Florida.*

[Warr (1999)] Warr P. (1999). Well-being and the workplace, *Well-being: The foundations of hedonic psychology* (pp. 392-412). New York, NY, US: Russell Sage Foundation, xii, 593 pp.

[White et al. (2009)] White M., Hill S., McGovern P., Mills C., and Smeaton, D. (2003). 'High-performance' Management Practices, Working Hours and Work-Life Balance. *British Journal of Industrial Relations*, 41(2), 175-195.

[Wooden et al. (2009)] Wooden M., Warren D., and Drago R. (2009). Working time mismatch and subjective well-being. *British Journal of Industrial Relations*, 47(1), 147-179.

5 Appendix

5.1 List of the psychosocial risks items

1) Variables used for *IND1*

Work demands

- Not having at least 48 consecutive hours of rest in a week
- working beyond the scheduled time
- Working pace with technical constraint
- Working pace with immediate dependence regarding the work of one or more colleagues
- Working pace with production standards or deadlines for a day at most
- Working pace imposed by an external demand (customers, public) requiring or not an immediate response
- Having to hurry (often or always)
- Having to frequently interrupt a task to do another unscheduled
- Occupying different positions
- Not being able to pause the job when desired
- Over the last twelve months, having to work while thinking that one should have to stay home because of sickness
- Not having sufficient time to properly carry out one's job
- Not being able to cooperate to properly carry out one's job
- Not having a sufficient number of staff to properly carry out one's job
- Not having sufficient means to properly carry out one's job
- Being asked to perform an excessive amount of work
- Working under pressure

Emotional demands

- Being in direct contact with the public
- An error in work can lead to serious consequences for the quality of service or product, or significant financial costs for the company
- An error in the job can lead to dangerous consequences for the safety of the employee or of other persons
- An error in work can lead to sanctions against the employee (risk for employment, significant decrease in earnings)
- Living situations of tension in relations with the public (users, patients, students, travellers, customers, suppliers, etc ...)
- Being in contact with people in distress, as part of the job
- Having to calm people, as part of the job
- Having to hide his emotions or pretend to be cheerful
- Fearing for one's job, for one's safety or that of others (sometimes)

Autonomy and leeway

- Having the possibility of change quantified targets
- Not having the possibility to vary the deadlines
- Must strictly apply the instructions to do one's job properly
- When something wrong occurs during work, the employee adjusts the incident personally most of the time
- The job consists in continually repeating the same series of gestures or operations
- The job involves monotonous tasks
- The job provides learning new things
- Working pace imposed by permanent checks and surveillance (or at least daily) exercised by management or a computerized tracking
- Not being able to organize the work in the manner that best suits the employee
- Not having the opportunity to develop one's professional skills

- Not having the opportunity to do things that the employee likes

Social and work relations

- Superior's guidance do not tell what to do and how to do it generally
- Not being helped by his superiors if the employee is struggling to make a difficult or tricky task
- Not being helped by persons with whom the employee normally works or others of the establishment if he is struggling to make a difficult or tricky task
- Living tense situations in the relationship with superiors
- Living tense situations in the relationship with colleagues
- Living tense situations in the relationship with the persons supervised
- Current professional position corresponds to the training of employee
- Disagreeing with superiors on how to do the job well
- Disagreeing with colleagues about how to do the job well
- Superiors pay attention to what the employee says
- Living at least one hostile behaviour by one or more persons of one's company

Conflicts of values

- Be well paid considering the work done
- Lacking certain skills to do the job properly
- Some of the employee's skills are not used
- Having to do things the employee disapproves
- Not experiencing often the pride of a job well done
- Not having the feeling of doing something useful to others

Economic insecurity

- Working without a contract
- Have fears for one's job for the coming year
- Over the last twelve months, the working environment has been under great change which questions the future of the employee's job
- Considering all the efforts made, the promotion prospects are not satisfactory

2) Variables used for *IND2*

Work demands

- Being forced to hurry (always or often)
- Being asked to perform an excessive amount of work
- Not having enough time to properly execute one's job

Emotional demands

- Suffer a hostile behaviour
- Living tensions with the public
- Being regressed by the public

Autonomy and leeway

- Having very little freedom to decide how to do the job
- Not having the opportunity to develop professional skills
- Repetition of the same gesture at a high rate (+ 10h)

Social and work relations

- The employee's colleagues do not help him
- The employee's superior does not help him
- The employee's superior does not pay attention to what he say

Conflicts of values

- The employee is treated unfairly and it bothers him
- The employee does not get the esteem he deserve and it bothers him

Economic insecurity

- The employee does not have the means to do his job properly
- The employee expects an undesirable change

- The employee's job security is threatened

3) Variables used for *IND3*

Work demands

- Working pace imposed by internal applications requiring an immediate response
- Working pace imposed by external requests requiring an immediate response
- Working pace with production deadlines to meet in one day maximum
- Sometimes it is impossible for the employee to comply with both the quality and the deadlines imposed or the rhythm of work
- Work beyond the usual duration without compensation (at rest or in salary)
- Dealing with peak activity
- Working pace disturbed by failures or IT incidents
- Working pace disturbed by failures of the machines
- No predictability of schedules
- Working on multiple sites
- Impossibility to pause the job when the employee wishes

Emotional demands

- An error in the employee's work could have negative consequences on himself
- An error in the employee's work could have negative consequences on others
- An error in the employee's work could lead to negative consequences for the company
- Feeling of not being able to cope or of being overwhelmed (STRESS variable)

Autonomy and leeway for unskilled labour

- Inability to change work objectives on its own initiative
- Strict enforcement of orders and instructions to properly do the job
- Inability to make suggestions for improvement of the position of labour, processes, machines ...
- In case of technical problems, the employee personally solves the incident
- Working pace with immediate dependence regarding the work of one or more colleagues
- Work continuously monitored
- Employee monitored by computer
- performing tasks not very different from each other
- Work hours determined by the company without possibility of negotiation

Autonomy and leeway for skilled labour

- Work does not allow the employee to learn new things
- The employee thinks that some skills are lacking him to do his job properly
- The employee thinks that certain of his skills are not used

Social and work relations

- The employee does not receive help
- Poor working atmosphere with colleagues
- Poor working atmosphere in the company
- In case of difficulty in a direct contact with the public, the employee manages it alone
- No explanation are given to employees about what the work in general

Conflicts of values

- The employee declares being poorly paid given the work he performs
- The employee estimates that his work is not recognized at its fair value
- The employee estimates that his work is not useful to others
- The employee declares not being involved in his work

Economic insecurity

- Lack of employment contract
- Risk of loss of employment the year after

5.1.1 List of the psychosocial risks items given by firms

Percentage of employees in the facility exposed to :

- The necessity to work in a hurry
- The feeling of not being able to do quality work
- Tensions between colleagues
- Tensions with the hierarchy
- Tensions with the public, customers
- The fear of becoming unemployed
- Unpredictable work schedules
- Excessive workload

5.2 PS Matching Confounding Variables

Table 11: Linear Regression of Confounding Variables on EVA

EVA		Coef.	Std. Err.
intercept		-1,236***	0,208
GENDER	1	-0,179***	0,067
AGE	2	0,426***	0,137
	3	0,111	0,138
	4	0,060	0,143
	5	0,276*	0,167
SENIORITY	2	0,212*	0,120
	3	0,243**	0,104
	4	0,213**	0,100
TPP	1	0,560***	0,090
COMPANY_SIZE	2	0,427***	0,164
	3	0,855***	0,175
	4	0,989***	0,171
	5	1,397***	0,183
	6	1,990***	0,181

* : p<0,1 ** : p<0,05 *** : p<0,01

Table 12: Balancing of Control Variable in PSM for Global Indexes

Variable	Unmatched/ Matched	Mean Treated	Mean Control	%bias	%reduct bias	t-test t	t-test p>t	V(T)/ V(C)
GENDER1	U	0,567	0,560	1,4		0,48	0,628	1,00
	M	0,567	0,571	-0,8	42,6	-0,31	0,753	1,00
AGE2	U	0,259	0,212	11,0		3,72	0,000	1,15*
	M	0,259	0,262	-0,7	93,5	-0,27	0,790	0,99
AGE3	U	0,306	0,318	-2,6		-0,87	0,385	0,98
	M	0,306	0,302	0,8	68,6	0,31	0,756	1,01
AGE4	U	0,278	0,295	-3,8		-1,28	0,199	0,96
	M	0,278	0,281	-0,8	78,2	-0,32	0,750	0,99
AGE5	U	0,101	0,090	3,4		1,16	0,248	1,10*
	M	0,101	0,101	-0,1	96,6	-0,04	0,966	1,00
SENIORITY2	U	0,110	0,119	-2,8		-0,96	0,338	0,93
	M	0,110	0,109	0,2	92,5	0,08	0,934	1,01
SENIORITY3	U	0,230	0,224	1,6		0,55	0,582	1,02
	M	0,230	0,236	-1,4	15,5	-0,52	0,602	0,98
SENIORITY4	U	0,519	0,477	8,5		2,89	0,004	1,00
	M	0,519	0,520	-0,1	98,4	-0,05	0,959	1,00
TPP1	U	0,875	0,804	19,2		6,67	0,000	0,70*
	M	0,875	0,883	-2,2	88,5	-0,95	0,340	1,06
COMPANY	U	0,257	0,430	-36,9		-12,74	0,000	0,78*
_SIZE2	M	0,257	0,258	-0,2	99,4	-0,09	0,929	1,00
COMPANY	U	0,142	0,156	-4,1		-1,40	0,162	0,92*
_SIZE3	M	0,142	0,146	-1,1	72,2	-0,44	0,657	0,98
COMPANY	U	0,194	0,184	2,6		0,87	0,385	1,04
_SIZE4	M	0,194	0,195	-0,3	89,9	-0,10	0,922	1,00
COMPANY	U	0,142	0,088	16,9		5,64	0,000	1,52*
_SIZE5	M	0,142	0,136	1,9	88,7	0,68	0,499	1,04
COMPANY	U	0,243	0,084	44,2		14,40	0,000	2,40*
_SIZE6	M	0,243	0,242	0,4	99,2	0,12	0,904	1,00

* if variance ratio outside [0.93; 1.07] for U and [0.93; 1.07] for M

5.3 Regression Results of Endogenous Switching Regression

Table 13: Endogenous Switching Regression for *IND1_S*

IND1_S	Coef.	Std. Err.	[95% Conf.	Interval]
Selection Equation				
intercept	-0,711**	0,321	-1,340	-0,083
ESOP	0,626***	0,044	0,539	0,713
GENDER1	-0,069	0,045	-0,158	0,020
L.AGE	-0,186**	0,089	-0,359	-0,012
COUPLE1	0,069	0,044	-0,018	0,155
ESC1	0,476***	0,067	0,345	0,608
SEC2	0,313***	0,058	0,200	0,425
SEC4	-0,265***	0,061	-0,384	-0,146
L.SENIORITY	0,059**	0,024	0,012	0,107
TPP1	0,26***	0,058	0,146	0,373
ACTV2	0,205**	0,085	0,040	0,371
ACTV4	0,156	0,103	-0,046	0,359
ACTV5	0,249***	0,091	0,071	0,427
ACTV6	0,397***	0,086	0,227	0,566
L.COMPANY_SIZE	0,141***	0,014	0,113	0,170
Regime 1				
intercept	29,384***	2,472	24,539	34,229
GENDER1	-0,35	0,313	-0,963	0,263
L.AGE	-2,319***	0,670	-3,632	-1,007
COUPLE1	0,34	0,316	-0,279	0,959
ESC1	-4,015***	0,469	-4,934	-3,096
SEC2	-1,836***	0,420	-2,659	-1,013
SEC4	0,805*	0,483	-0,142	1,751
L.SENIORITY	0,504***	0,180	0,151	0,857
TPP1	0,638	0,455	-0,254	1,530
ACTV2	-0,651	0,688	-1,998	0,697
ACTV4	0,888	0,818	-0,714	2,490
ACTV5	0,312	0,732	-1,123	1,746
ACTV6	0,163	0,693	-1,195	1,520
L.COMPANY_SIZE	-0,061	0,107	-0,271	0,148
Regime 2				
intercept	29,872***	2,904	24,179	35,564
GENDER1	0,349	0,437	-0,507	1,205
L.AGE	-2,305***	0,791	-3,856	-0,754
COUPLE1	0,113	0,408	-0,687	0,912
ESC1	-1,645**	0,787	-3,187	-0,103
SEC2	-0,582	0,605	-1,768	0,604
SEC4	-0,665	0,559	-1,761	0,431
L.SENIORITY	0,568***	0,216	0,145	0,991
TPP1	0,145	0,539	-0,911	1,201
ACTV2	-1,798**	0,714	-3,197	-0,398
ACTV4	-3,782***	0,863	-5,474	-2,091
ACTV5	-1,218	0,785	-2,757	0,322
ACTV6	-2,578***	0,732	-4,012	-1,144
L.COMPANY_SIZE	0,3	0,191	-0,075	0,676

* : p<0,1 ** : p<0,05 *** : p<0,01

Table 14: Endogenous Switching Regression for *IND1_F*

IND1_F	Coef.	Std. Err.	[95% Conf.	Interval]
Selection Equation				
intercept	-0,713**	0,321	-1,342	-0,084
ESOP	0,626***	0,044	0,539	0,713
GENDER1	-0,069	0,045	-0,158	0,021
L.AGE	-0,185**	0,089	-0,359	-0,012
COUPLE1	0,069	0,044	-0,018	0,155
ESC1	0,477***	0,067	0,346	0,608
SEC2	0,313***	0,058	0,200	0,426
SEC4	-0,266***	0,061	-0,385	-0,146
L.SENIORITY	0,06**	0,024	0,013	0,107
TPP1	0,26***	0,058	0,146	0,374
ACTV2	0,205**	0,085	0,039	0,371
ACTV4	0,155	0,103	-0,047	0,358
ACTV5	0,248***	0,091	0,070	0,426
ACTV6	0,395***	0,086	0,225	0,564
L.COMPANY_SIZE	0,141***	0,014	0,113	0,169
Regime 1				
intercept	0,495***	0,044	0,409	0,581
GENDER1	-0,008	0,006	-0,019	0,003
L.AGE	-0,039***	0,012	-0,062	-0,016
COUPLE1	0,005	0,006	-0,006	0,016
ESC1	-0,059***	0,008	-0,075	-0,043
SEC2	-0,023***	0,007	-0,038	-0,008
SEC4	0,007	0,009	-0,010	0,024
L.SENIORITY	0,009***	0,003	0,002	0,015
TPP1	0,01	0,008	-0,006	0,026
ACTV2	-0,008	0,012	-0,032	0,016
ACTV4	0,009	0,014	-0,019	0,038
ACTV5	0,006	0,013	-0,020	0,031
ACTV6	0,003	0,012	-0,021	0,027
L.COMPANY_SIZE	-0,001	0,002	-0,005	0,003
Regime 2				
intercept	0,492***	0,051	0,392	0,592
GENDER1	0,005	0,008	-0,010	0,020
L.AGE	-0,041***	0,014	-0,068	-0,014
COUPLE1	0,003	0,007	-0,011	0,017
ESC1	-0,018	0,014	-0,045	0,009
SEC2	0,001	0,011	-0,020	0,021
SEC4	-0,013	0,010	-0,033	0,006
L.SENIORITY	0,01***	0,004	0,002	0,017
TPP1	0,007	0,009	-0,011	0,025
ACTV2	-0,016	0,012	-0,040	0,009
ACTV4	-0,056***	0,015	-0,085	-0,026
ACTV5	-0,012	0,014	-0,039	0,015
ACTV6	-0,034***	0,013	-0,059	-0,009
L.COMPANY_SIZE	0,006**	0,003	0,000	0,013

* : p<0,1 ** : p<0,05 *** : p<0,01

Table 15: Endogenous Switching Regression for *IND2_S*

IND2_S	Coef.	Std. Err.	[95% Conf.	Interval]
Selection Equation				
intercept	-0,707**	0,321	-1,335	-0,078
ESOP	0,627***	0,044	0,540	0,714
GENDER1	-0,069	0,046	-0,158	0,020
L.AGE	-0,185**	0,089	-0,359	-0,012
COUPLE1	0,07	0,044	-0,017	0,156
ESC1	0,477***	0,067	0,346	0,608
SEC2	0,312***	0,058	0,199	0,425
SEC4	-0,263***	0,061	-0,382	-0,144
L.SENIORITY	0,059**	0,024	0,012	0,106
TPP1	0,257***	0,058	0,144	0,371
ACTV2	0,205**	0,085	0,039	0,371
ACTV4	0,157	0,103	-0,046	0,359
ACTV5	0,248***	0,091	0,070	0,427
ACTV6	0,396***	0,086	0,227	0,565
L.COMPANY_SIZE	0,14***	0,014	0,112	0,168
Regime 1				
intercept	5,126***	0,962	3,240	7,012
GENDER1	-0,299**	0,121	-0,536	-0,062
L.AGE	-0,023	0,259	-0,532	0,485
COUPLE1	0,131	0,122	-0,109	0,370
ESC1	-1,442***	0,183	-1,802	-1,083
SEC2	-0,658***	0,163	-0,978	-0,338
SEC4	0,145	0,188	-0,223	0,514
L.SENIORITY	0,211***	0,070	0,074	0,348
TPP1	0,109	0,177	-0,238	0,456
ACTV2	-0,096	0,266	-0,617	0,426
ACTV4	0,579*	0,316	-0,041	1,199
ACTV5	0,343	0,283	-0,213	0,899
ACTV6	0,412	0,268	-0,114	0,938
L.COMPANY_SIZE	-0,054	0,043	-0,138	0,031
Regime 2				
intercept	6,368***	1,116	4,180	8,556
GENDER1	-0,279*	0,168	-0,608	0,051
L.AGE	0,033	0,304	-0,563	0,629
COUPLE1	0,033	0,157	-0,274	0,341
ESC1	-0,83***	0,300	-1,418	-0,242
SEC2	-0,373	0,231	-0,826	0,081
SEC4	-0,155	0,214	-0,575	0,265
L.SENIORITY	0,14*	0,083	-0,022	0,303
TPP1	-0,034	0,206	-0,439	0,370
ACTV2	-0,585**	0,275	-1,123	-0,047
ACTV4	-1,491***	0,332	-2,141	-0,840
ACTV5	-0,265	0,302	-0,857	0,327
ACTV6	-0,68**	0,281	-1,231	-0,128
L.COMPANY_SIZE	0,051	0,072	-0,091	0,192

* : p<0,1 ** : p<0,05 *** : p<0,01

Table 16: Endogenous Switching Regression for *IND2_F*

IND2_F	Coef.	Std. Err.	[95% Conf.	Interval]
Selection Equation				
intercept	-0,707**	0,321	-1,335	-0,079
ESOP	0,627***	0,044	0,539	0,714
GENDER1	-0,069	0,046	-0,158	0,020
L.AGE	-0,185**	0,089	-0,359	-0,012
COUPLE1	0,069	0,044	-0,017	0,156
ESC1	0,477***	0,067	0,346	0,608
SEC2	0,312***	0,058	0,199	0,425
SEC4	-0,264***	0,061	-0,383	-0,145
L.SENIORITY	0,059**	0,024	0,012	0,106
TPP1	0,258***	0,058	0,144	0,371
ACTV2	0,205**	0,085	0,039	0,371
ACTV4	0,157	0,103	-0,046	0,359
ACTV5	0,248***	0,091	0,070	0,426
ACTV6	0,396***	0,086	0,226	0,565
L.COMPANY_SIZE	0,14***	0,014	0,112	0,168
Regime 1				
intercept	0,362***	0,059	0,246	0,478
GENDER1	-0,021***	0,007	-0,036	-0,006
L.AGE	-0,015	0,016	-0,046	0,017
COUPLE1	0,008	0,008	-0,007	0,022
ESC1	-0,094***	0,011	-0,116	-0,072
SEC2	-0,042***	0,010	-0,062	-0,022
SEC4	0,014	0,012	-0,009	0,037
L.SENIORITY	0,013***	0,004	0,004	0,021
TPP1	0,01	0,011	-0,012	0,031
ACTV2	0	0,016	-0,032	0,032
ACTV4	0,032*	0,019	-0,006	0,070
ACTV5	0,024	0,017	-0,010	0,059
ACTV6	0,024	0,017	-0,008	0,056
L.COMPANY_SIZE	-0,003	0,003	-0,008	0,003
Regime 2				
intercept	0,443***	0,068	0,308	0,577
GENDER1	-0,021**	0,010	-0,042	-0,001
L.AGE	-0,016	0,019	-0,052	0,021
COUPLE1	0,001	0,010	-0,018	0,019
ESC1	-0,052***	0,018	-0,088	-0,016
SEC2	-0,021	0,014	-0,049	0,007
SEC4	-0,005	0,013	-0,030	0,021
L.SENIORITY	0,009*	0,005	-0,001	0,019
TPP1	0,003	0,013	-0,022	0,028
ACTV2	-0,025	0,017	-0,058	0,008
ACTV4	-0,085***	0,020	-0,124	-0,045
ACTV5	-0,014	0,019	-0,051	0,022
ACTV6	-0,043**	0,017	-0,077	-0,009
L.COMPANY_SIZE	0,004	0,004	-0,005	0,013

* : p<0,1 ** : p<0,05 *** : p<0,01

Table 17: Endogenous Switching Regression for *IND3_S*

IND3_S	Coef.	Std. Err.	[95% Conf.	Interval]
Selection Equation				
intercept	-0,714**	0,321	-1,343	-0,086
ESOP	0,627***	0,044	0,541	0,714
GENDER1	-0,069	0,045	-0,158	0,020
L.AGE	-0,186**	0,089	-0,359	-0,012
COUPLE1	0,067	0,044	-0,019	0,153
ESC1	0,475***	0,067	0,344	0,606
SEC2	0,312***	0,058	0,199	0,425
SEC4	-0,267***	0,061	-0,386	-0,147
L.SENIORITY	0,06**	0,024	0,013	0,107
TPP1	0,261***	0,058	0,147	0,375
ACTV2	0,21**	0,085	0,044	0,376
ACTV4	0,157	0,103	-0,046	0,359
ACTV5	0,252***	0,091	0,074	0,430
ACTV6	0,397***	0,086	0,228	0,566
L.COMPANY_SIZE	0,141***	0,014	0,113	0,169
Regime 1				
intercept	18,775***	1,563	15,712	21,838
GENDER1	0,196	0,198	-0,192	0,584
L.AGE	-1,513***	0,424	-2,343	-0,682
COUPLE1	0,055	0,200	-0,337	0,447
ESC1	-1,627***	0,297	-2,208	-1,045
SEC2	-0,578**	0,266	-1,098	-0,057
SEC4	1,608***	0,305	1,010	2,206
L.SENIORITY	0,282**	0,114	0,059	0,506
TPP1	0,667**	0,287	0,103	1,230
ACTV2	-0,22	0,435	-1,072	0,632
ACTV4	0,465	0,517	-0,549	1,478
ACTV5	-0,222	0,463	-1,129	0,685
ACTV6	-0,521	0,438	-1,379	0,337
L.COMPANY_SIZE	-0,038	0,067	-0,170	0,094
Regime 2				
intercept	17,271***	1,827	13,691	20,852
GENDER1	0,679**	0,274	0,141	1,217
L.AGE	-1,289***	0,498	-2,265	-0,313
COUPLE1	-0,092	0,256	-0,594	0,411
ESC1	-0,187	0,499	-1,165	0,791
SEC2	0,195	0,382	-0,554	0,945
SEC4	0,595*	0,353	-0,097	1,286
L.SENIORITY	0,29**	0,136	0,024	0,557
TPP1	0,33	0,340	-0,336	0,996
ACTV2	-0,391	0,449	-1,271	0,488
ACTV4	-1,73***	0,542	-2,793	-0,667
ACTV5	-0,524	0,494	-1,492	0,444
ACTV6	-1,949***	0,460	-2,851	-1,048
L.COMPANY_SIZE	0,177	0,123	-0,065	0,418

* : p<0,1 ** : p<0,05 *** : p<0,01

Table 18: Endogenous Switching Regression for *IND3_F*

IND3_F	Coef.	Std. Err.	[95% Conf.	Interval]
Selection Equation				
intercept	-0,713**	0,321	-1,341	-0,084
ESOP	0,626***	0,044	0,540	0,713
GENDER1	-0,069	0,045	-0,158	0,020
L.AGE	-0,186**	0,089	-0,359	-0,012
COUPLE1	0,067	0,044	-0,020	0,153
ESC1	0,477***	0,067	0,345	0,608
SEC2	0,313***	0,058	0,200	0,426
SEC4	-0,266***	0,061	-0,385	-0,146
L.SENIORITY	0,06**	0,024	0,013	0,107
TPP1	0,261***	0,058	0,147	0,374
ACTV2	0,21**	0,085	0,044	0,376
ACTV4	0,156	0,103	-0,046	0,358
ACTV5	0,253***	0,091	0,075	0,431
ACTV6	0,397***	0,086	0,228	0,566
L.COMPANY_SIZE	0,141***	0,014	0,113	0,169
Regime 1				
intercept	0,528***	0,045	0,439	0,617
GENDER1	0,005	0,006	-0,006	0,016
L.AGE	-0,042***	0,012	-0,067	-0,018
COUPLE1	0,003	0,006	-0,008	0,014
ESC1	-0,04***	0,009	-0,057	-0,023
SEC2	-0,014*	0,008	-0,029	0,001
SEC4	0,036***	0,009	0,019	0,054
L.SENIORITY	0,005	0,003	-0,002	0,011
TPP1	0,018**	0,008	0,001	0,034
ACTV2	-0,001	0,013	-0,026	0,024
ACTV4	0,007	0,015	-0,022	0,037
ACTV5	-0,002	0,013	-0,028	0,024
ACTV6	-0,01	0,013	-0,035	0,015
L.COMPANY_SIZE	-0,001	0,002	-0,005	0,003
Regime 2				
intercept	0,483***	0,053	0,379	0,586
GENDER1	0,022***	0,008	0,007	0,038
L.AGE	-0,037***	0,014	-0,065	-0,009
COUPLE1	-0,004	0,007	-0,019	0,010
ESC1	-0,004	0,014	-0,033	0,024
SEC2	0,007	0,011	-0,015	0,028
SEC4	0,011	0,010	-0,009	0,031
L.SENIORITY	0,007*	0,004	-0,001	0,014
TPP1	0,009	0,010	-0,011	0,028
ACTV2	-0,004	0,013	-0,029	0,021
ACTV4	-0,046***	0,016	-0,076	-0,015
ACTV5	-0,008	0,014	-0,036	0,020
ACTV6	-0,051***	0,013	-0,077	-0,025
L.COMPANY_SIZE	0,006*	0,004	-0,001	0,013

* : p<0,1 ** : p<0,05 *** : p<0,01