

Work Organisation, Employment Relations and Pay Setting: Evidence for Ten European Countries

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ABSTRACT

In this paper we analyse the relationship between the change in the organisation of production and the search for more flexibility in wage determination. Differently from other studies concerned on this issue, we use information on ten European countries. We consider three main areas of flexibility: numerical flexibility, functional flexibility and pay flexibility. In this context, we try to shed more light on the determinants of changes in the organisation of work and their consequences on the adoption of more flexible pay policies. This paper has two central aims. The first is descriptive and entails an examination of the extent to which firms in ten European countries have adopted both High Performance Work Organisations and more flexible pay systems. The second is explanatory and involves an analysis of the determinants of more flexible system of remuneration and, in particular, the effects of organisational changes and new technology on (more or less innovative) pay practices. As a consequence, we investigate the relationship between organisational change and the remuneration system under different institutional settings and industrial relation practices. The key data set for our research is the EPOC (Employee direct Participation in Organisational Changes) Survey carried out in 1996 for ten European countries by the European Foundation for the Improvement of Living and Working Conditions. As the main focus of the EPOC Survey is on employer characteristics, it covers a wide range of personnel management and industrial relation practices ranging from the structure of employee representation, pay methods, work practices and investment in innovation and allows to investigate the determinants of organisational change and the differences in the adoption of those practice between countries.

1. INTRODUCTION

In recent years, a growing body of literature has been concerned on the analysis of the characteristics of “high involvement” and “high performance” work systems. The argument behind this area of research has been double: from one side, the recognition that firms where the work is organised with the logic of mass production are no longer compatible with current, globalised and more competitive markets, which demand to compete on the basis of quality, innovation and customisation and, as a consequence, require more flexible organisations both of production and work; from the other side, the focus has been on the consequences of the use of new technologies - technological progress provide a great opportunity to increase productivity and firm performance but to fully capture the advantages of technological opportunities and to obtain increase in productivity, requires also changes in the organisation of production and work (Brjsholfsoonn and Hitt, 1995 and 1998).

Within the wider Human Resource Management debate, a central role has been played by the analysis of those changes in compensation systems driven by the use of new technologies and the related changes in the organisation of production and work. In fact, starting from Piore and Sabel (1984), many observers expressed the idea that employers have been concerned to reduce the influence of established systems of job and pay classification in order to facilitate technical and organisational change (Marsden, 1992; OCSE, 1999; Osterman, 1994; Poole and Jenkins, 1998). In contrast with the “old” pay system, incorporating job-evaluated grade structures, payments by time and seniority, the concept of “new pay” is based of the notion of a “fit” between rewards and the strategy of the firm and is more likely lead to an individualisation of wage, in which rewards are more based on competencies (especially skill). This is clearly different from production or job-related payments, which were used with Taylorist methods of mass production.

Although the anecdotal evidence suggest that there has been an explosion in the use of pay-for-performance or profit-sharing schemes and that especially innovative firms experience changes in rules governing wages, very little empirical work has been done to shed more light on the relationship between the use of both new technology and new forms of work organisation and the implementation of more flexible and performance-based pay policies.

In this paper we try to shed more light on this relationship with two objectives and at two different level of analysis. The first aim is to look at the diffusion of new technology, new work practices and new pay practices. As our data-set contains information on firms in ten different countries, in this case we operate an analysis at aggregate level, looking at the differences between country. In the second part of the paper, as the starting data coming from the Survey we use are at firm level, we look at the determinants of new pay methods, and, in this context, at the influence of market forces, innovations, new work organisations and industrial relations on remuneration systems.

2. THE SURVEY

In order to examine reward system as a part of human resource management, our key data-set is the EPOC (Employee direct Participation in Organisational Change) Survey carried out in 1996 by the European Foundation for the Improvement of Living and Working Conditions.

As the main focus of the EPOC is on employer characteristics, it covers a wide range of personnel management and industrial relations practices ranging from the structure of employee representation, pay systems, work practices and investment in innovation activity.

Is a representative Survey that covers workplaces (all sectors, with the exception of agriculture) in ten EU countries: Denmark, France, Germany, Ireland, Italy, the Netherlands, Portugal, Spain, Sweden, UK.

Respondents were workplace (establishment) general managers and are asked to answer the questions for their establishment. It should be noted that survey data present managerial perceptions of their organisation, so responses may be mediated by respondent's understanding.

For the larger countries (Fra, Ger, Ita, Spa, UK) the gross sample was 5,000 workplaces: for the medium sized countries (Den, Neth, Swe) 2,500 and for the smaller (Irl, Port) 1,000. The gross sample of workplaces is representative of social and economic conditions, I. E. differed for ten countries according to population size, number of employees in industry and services.

Only workplaces with more than 20 employees are considered.

From the gross sample of 33,427 questionnaires, 5,786 (our number of observation) has been returned (a response rate around 18 per cent). This is not unusual of this type of survey, although this could lead to some sample selection biases. Nevertheless, there is no direct evidence on the characteristics of non-respondent¹. From this sample, we obtain 5,168 observations available for the regression analysis.

For what concerns possible sample distortions, there are sector and size weight to reflect the original research universe, as well as country weight that accounts for the number of employees represented in the data set for each country and the overall size of the workplace in that country.

¹ The overall response rate was almost 18 per cent – with a range between 9 per cent (Spain) and 39 percent (Ireland).

3. SOME AGGREGATE FIGURES

3.1 The diffusion of new technologies in European countries

We consider both the introduction of *new products* (prod_innov) and *new processes* (the use of Information and Communication Technologies).

- Columns indicates the percentage of firms that introduced the related type of innovation during the period 1993-96.

Table 1 – Percentage of innovative firms

	Product innov.	ICT
Denmark	28,9	46,7
France	31,7	30,5
Germany	26,4	28,7
Ireland	18,1	48,4
Italy	34,1	45,5
Netherland	28,7	17,4
Portugal	24,2	31,2
Spain	32,4	37,8
Sweden	26,1	44,8
UK	27,6	51,2
AVERAGE	27,82	38,22

- On average, the adoption of ICT (considered the new technological “paradigm”) has been widespread and higher than the introduction of product innovation
- In many cases, the percentage of firms introducing ICT is between 30 and 50%.
- It seems to exist a sort of trade-off between ITC and prod_inn (coefficient of correlation equal to $-0,15$)

3.2 Functional flexibility and the change in internal work organisation.

The biggest problem in this type of analysis is that there is no unambiguous way of defining which are the “core” characteristics of High Performance Work Organisations (HPWO, Osterman, 1994, 2000). One problem consist on the necessity to find some variables and indicators that simplify the variety and complexity of actual practices. At the same time, it is necessary that the set of chosen indicators is “highly informative” of firm’s conditions.

In general, flexibility means the capacity of a system to adapt its organisation to changes in the external conditions, and, nowadays, to the consequences of shifts in the production functions driven maily by globalisation, competition and the diffusion of new technologies (Snower, 1999).

In order to ensure a reasonable level of international comparability, the large set of practices related to organisational change reported in the EPOC Survey was synthesised into a set of detailed and summary measures. These are cardinal measures that are increasing with the degree of flexibility. Columns indicates the percentage of firms that introduced the related practice during the period 1993-96.

The summary indicator (RK) ranges from 1 to 10 (maximum degree of flexibility), according to the differences in the aggregate intensity of reported indicators.

According also to previous studies (Osterman, 1994, 2000; Black e Lynch, 1997, 2000; Cappelli, 2000), we decide to use five (commonly used in literature) detailed indicators²

- flattening in the structure of management (*flat_str*)
- more involvement of low-level workers in decisional process (*inv_lowlev*)
- the presence of team work (*team_work*)
- job rotation of workers across different tasks (*job_rot*).
- high levels of work involvement in different task (*multitasking*)

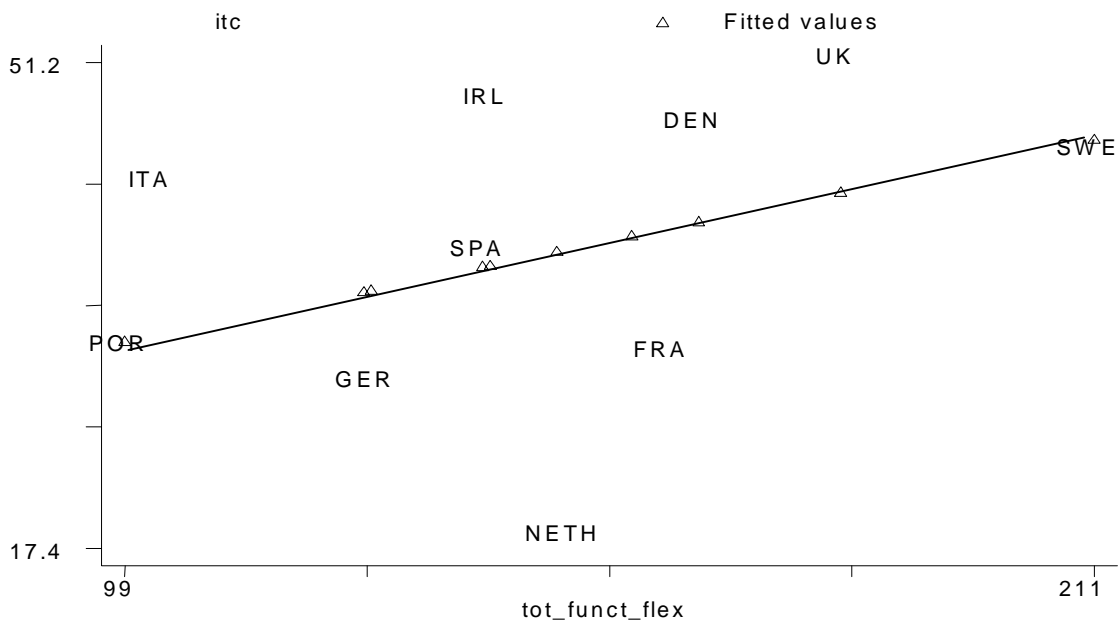
Table 2 –New forms of work organisation

	<i>flat_str</i>	<i>inv_low</i>	<i>team</i>	<i>multitask</i>	<i>job_rot</i>	<i>Tot_funct_flex</i>	<i>Rk</i>
Denmark	42	10	40	50	28	<i>170</i>	8
France	21	44	30	61	6	<i>162</i>	7
Germany	30	19	20	28	7	<i>104</i>	3
Ireland	23	32	27	53	10	<i>145</i>	5
Italy	10	24	28	24	13	<i>99</i>	2

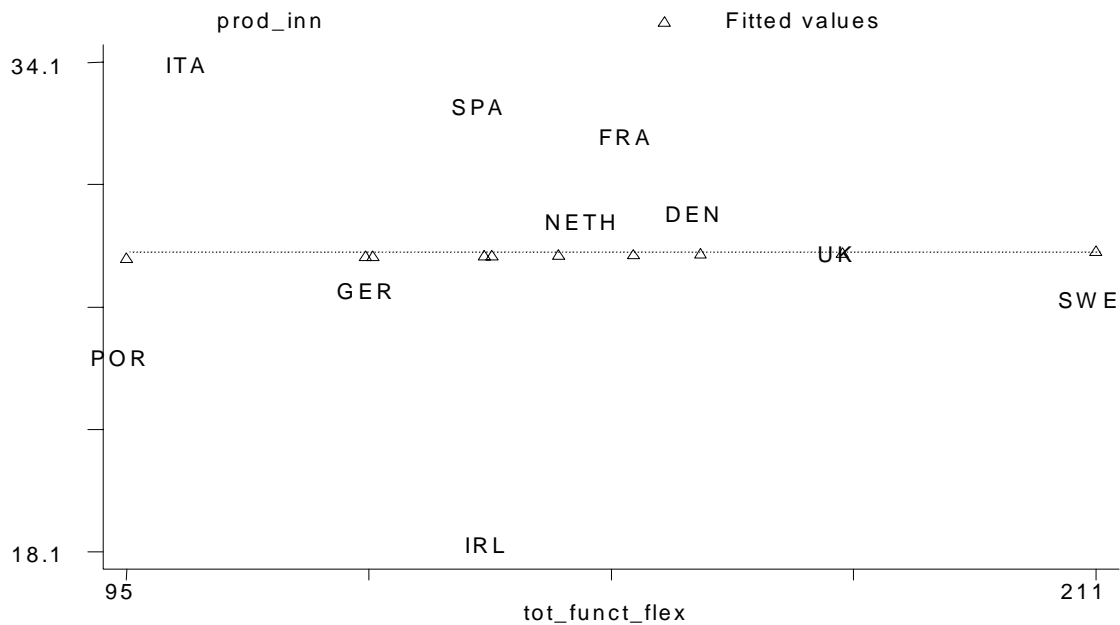
² In parentheses the name of the variable reported in the tables.53

Netherlands	47	46	9	41	9	152	6
Portugal	3	9	22	52	9	95	1
Spain	10	33	34	53	14	144	4
Sweden	46	60	29	38	38	211	10
UK	45	48	33	41	13	180	9
A.V.	29,6	32,5	27,2	40	14,7	144	

- Most adopted practices are multitasking, the flattening of hierarchical structure, the involvement of low levels in decisional process and the use of teams. Less common is the introduction of job rotation.
 - Quite surprisingly, multitasking is widely used also in some countries (like Portugal and Spain) which are at the bottom in the ranking (but, in this case, could reflect low levels of specialisation in the workforce)
 - Big differences between countries: only UK and Sweden adopted the whole set of practices with percentages on average
- In addition, the introduction of ICT and the implementation of org. Change seem to be (less) positively correlated



- If, from one side, process innovations and an increase in work flexibility shows a relationship of complementary, on the other side there isn't any clear correlation between product innovations and functional flexibility



In addition, if we consider the relationship among innovative practices (coefficient of correlation):

	flat_str	inv_low	team	job_rot	multitask
ict	0.11*	0.15*	0.19*	0.13*	0.04*
prod_inn	0.08*	0.13*	0.17*	0.15*	-0.004*

N. B.: * = 1% statistical significance

- the diffusion of team work and the adoption of new technology are strong complement. ICT clusters also with job rotation .
- The inspection of correlation between product innovations and each single practice confirms that these variables doesn't seem strongly related

3.2 External flexibility and the change in the firm's organisation of production.

The set of variables used as a proxy of the presence of innovative system of production combine information about the decision of the production form and firm's strategy.. In table 2, we show which is the proportion of firms that, within a country, implemented in the period 1993-96 the following practices:

- downsizing (downsizing)
- outsourcing (outsourcing)
- Strategic alliance (strat_alliance)
- return to the core business (back_core_bnss).

Table 4 – Index of change in firm’s organisation

	downsizing	outsourcing	Strat_alliance	back_core_bnss	Tot_prod	RK
Denmark	9,6	15,6	22	16	63,2	4
France	28	15,9	9	17	69,9	6
Germany	19,9	17,6	9,7	19	66,2	5
Ireland	21,2	22,8	14	15	73	7
Italy	15,8	11	13	3,2	43	2
Netherlands	25,3	22	14	13	74,3	9
Portugal	20,5	18,8	8,7	4	52	3
Spain	6,5	8	13,5	3,5	31,5	1
Sweden	43,4	16,1	9	5	73,4	8
UK	31,9	13,2	16	15,6	76,7	10
AVERAGE	<i>22,21</i>	<i>16,1</i>	<i>12,1</i>	<i>13,2</i>	<i>63,6</i>	

Although there are significant differences between countries and their relative position in the ranking of summary indicator is quite similar to the previous one – at least for the top and for the bottom– the standard deviation in the overall adoption of practice is equal to 38 for variables expression of change in the organisation of work and to 13,7 for those related to the presence of new styles in the organisation of production.

From table 2, we can also notice that, the most adopted types of innovation in firm’s organisation are downsizing and outsourcing, while the use of ICT and the introduction of product innovations, while it seems more unusual to change the productive chain.

3.4 The diffusion of innovative pay methods in Europe.

In the new system of production individual performance appears every day more important. Where there is great flexibility in the management of human resources, the workforce is usually requested to perform a great variety of task. In this context, a greater individualisation of wage determination has been often advocated in order to improve the functioning of labour market. In fact, it seems that a more flexible system of remuneration could be more efficient than a fix grid of wages.

This depends on the existence of a double trade off that influence effort; in a principal-agent perspective, the trade-off between the intensity of supervision and wage incentives; and a trade-off between the initiatives that are performed by the agent because of the partial or total delegation of task (which are typically performed by the principal) and the resultant loss of control. This transfer of authority to the agent (in the de-verticalised) firms and the parallel diffusion of multitasking imply the principal's loss of control over agent behaviour and this opens the door to pay incentives based on observable performance, both in terms of output and financial results.

Table 3 shows some figures related to the degree of flexibility in pay for the sample of European countries object of our investigation (for a definition of variables, see the appendix).

In literature very different forms of individualisation of pay are often analysed jointly. However, in order to test the relationships with new organisational practices, we separate out traditional methods (bonuses, pay for skill) from more innovative methods (profit sharing, share of ownership, pay for individual output, pay for team output)

Pay flexibility

- pay for individual skill (pay_skill)
- bonuses related to individual attitude (bonuses)

- pay for individual output (pay_ind_out)
- pay for team output (pay_team_out)

- profit-sharing (prof_share)
- share ownership (own_share)

Table 4 – Index of flexibility in pay methods

	TRADITIONAL METHODS (individualisation of pay)		INNOVATIVE METHODS (output-related pay)			
			<i>Pay for productivity</i>		<i>Pay for performance</i>	
	pay_skill	bonus	pay_ind_out	pay_team_out	prof_share	own_share

Denmark	29	9	12	18	9	6
France	50	16	14	12	43	6
Germany	75	25	27	14	11	3
Ireland	23	16	14	22	7	3
Italy	29	19	22	38	5	2
Nether.	50	13	11	9	13	4
Portugal	33	14	14	5	5	5
Spain	25	13	22	21	11	12
Sweden	19	8	7	22	15	1
UK	37	14	18	25	38	22
<i>AVER.</i>	<i>37</i>	<i>14,7</i>	<i>16,1</i>	<i>18,6</i>	<i>15,7</i>	<i>6,4</i>

- there are large differences in the use of these schemes and innovative pay methods are not commonly adopted (especially the share of profit and ownership)
- UK very flexible, countries like Sweden demonstrate to have implemented a lot of changes in the organisation of work maintaining a traditional pay system (I. E. strong union power).
- In Italy a large number of firms introduced innovations in “traditional flexibility” and not in innovative pay systems and work org.
- The recourse to new practices is limited by almost all countries to forms of “pay for productivity”, in particular in countries- like Italy and Germany- where the “external” flexibility in the labour market is rather scarce and the system of industrial relations is still centralised.

4. ANALYSIS OF FLEXIBLE PAY METHODS' DETERMINANTS

In this section, we analyse which is the impact of new technology's adoption, work and external organisation on the adoption of innovative pay methods. In addition to variables just introduced, we use a number of additional variables to control for industrial climate, market pressures, as well as employment relations systems.

4.1 Definition of explanatory variables

The independent variables are intended to take into account a great number of factors that could influence the decision of firms about the choice of a pay setting adequate to their characteristics. We grouped together variables into five categories.

Firm's market structure

It seems reasonable to suppose that the nature of establishment's competitors and of its market will influence performance, thus giving a role to the choice of pay system. For this reason we include a dummy variable (*owned*) which takes positive sign if the firm is a part of larger organisation, another dummy variable to identify whether the firm is profit-oriented (*profit*). In addition, there is a variable (*competition*, which ranges from 1 to 4) which takes higher values if the firm operate in a competitive context opened both to national and foreign competition (globalised markets), and another one (*incr_compet*) which is equal to 1 if the firm experienced an increase in the degree of competition in the period 93-96. Normally, one might expect that firms operating in competitive context are forced to adapt their pay system in the direction of the adoption of performance-related pay, as to incentivate the workforce to increase efficiency and productivity.

Firm characteristics

In this category, we group a series of variables describing the establishment characteristics. First of all, we use six categorical variables to identify the firm size. In the rest of the paper, the omitted category will be the smaller size (*size less50*). In previous studies, the hypothesis that large firms are more likely to encourage performance-related pay policies is well supported by the evidence (see Poole and Jenkins, 1998). In addition, there are three variables describing some characteristics of employment relations within the firm and are: a (dummy) variable which captures whether a firms use intensively high-skilled workers (*skill intensity*); a (dummy) variable that indicates if the firm has introduced a flexible working time (*time flexib.*); and, at last, a (dummy) variable which takes the positive value if the firm offers on-the-job training (*training*).

Industrial relations

In this group we include a continuous variable indicating the percentage of union density (*density*) and a dummy variable to take into account if an establishment is covered by a collective agreement (*coverage*). By principle, unions should be against the adoption of more flexible pay policies, as well as a greater individualisation of pay. Nevertheless, at least for some more traditional forms of pay (*bonuses and pay_skill*) could find more profitable to cooperate with firms to ensure high levels of wage. On the opposite, they should be against the idea to link part of the remuneration to firm or individual performance

High Performance Work Organisations

In this group we include the set of variables presented in a previous section of the paper. Each variable – job rotation (*job_rotat*), more involvement of low level workers in decision process (*inv_lowlevel*), flattening in the structure of management (*flattening*), work teams (*work_teams*), *multitasking* – is a dummy variable equal to 1 if the establishment introduced the related practice in the period 1993-96.

Change in firm's (external organisation).

As discussed before, these variables capture, by some extent, the strategic behaviour of the firm. Other studies showed that strategical decisions could have some effect on pay policies: de-verticalisation processes (*downsizing and outsourcing*), concentration on core business (*back_core_buss*), the and the introduction of “slim” organisations are implemented to enforce efficiency and enhance productivity; in this sense, they could the introduction of pay incentive policies could be seen as tools to pursue these objectives by firms during a period of restructuring and redefinition of their role on the market.

Innovation's indicators

By many observers, ICT is the engine that has driven the increase in productivity

Other control variables

To take into account sectoral and country effects, we include in the regression analysis several dummies, one for each sector, and one for each country. (see the list below)

Sectoral dummies:

- Mining (*mining*)
- Transport, warehousing and communic. (*transp_comm*)
- Manufacturing industry (*manufact*)
- Process industry (*process*)

Banking/insurance (*bank_ins*)
 Professional services (*prof_serv*)
 Public utilities (*pub_utility*)
 Public administration (*pub_adm*)
 Construction and installation (*constr*)
 Education (*educ*)
 Wholesale (*sale*)
 (public) health and social welfare (*health_welf*)
 retail trade (*trade*)
 culture and recreation/leisure (*leisure*)
 catering/hotels (*hotel*)

Country dummies

Netherland (*neth*)
 Germany (*ger*)
 Spain (*spa*)
 Denmark (*denm*)
 Ireland (*irl*)
 France (*fra*)
 Italy (*ita*)
 Sweden (*swe*)
 United kingdom (*uk*)

4.2 Estimation results

The procedure to test the effects of our set of explanatory variables (and especially of HPWO) of pay policies consist in three steps. First, we estimated a logit model in which the dependent variable equals one if an establishment use some innovative pay practices, defined as described below. In other words, we assign a value equal to zero if an establishment doesn't utilise any form of pay flexibility or uses only some traditional forms of pay flexibility (wage incentives based on individual characteristics of bonuses). The reason why we operate this type of choice is based on the assumption that many firms adopting only traditional forms of pay flexibility aren't very innovative, because this type of incentive doesn't lead to improve efficiency or productivity. Bonuses are not connected with any specific parameter and pay-for-skill is based only on individual characteristic and not on individual performance. This type of pay flexibility hasn't been designed to increase productivity, but, often, to lower labour cost by preventing conflicts. because is based on individual characteristics and not of output results. The result of this type of analysis are presented in the table 4.

Table 4. Effects of HPWO and employment relations on innovative pay settings

Independent variables	Dependent variable: Innovative forms of pay
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<i>Firm characteristics (omitted: size less 50)</i>	
Size 50-100	0.13
Size 100-200	0.27**
Size 200-500	0.31***
Size 500-1000	0.30**
Size more 1000	0.5***
Skill intensity	0.03
Time flexibility	0.19***
Training	0.3***
<i>Firm's market structure</i>	
Owned	0.24***
Profit	0.83***
Level of competition	0.19***
Increase competition	0.16**
<i>Industrial relations</i>	
Density	-0.25**
coverage	-0.22**
<i>Innovation activity</i>	
Product innovations	0.18***
ICT	0.2***
<i>HPWO</i>	
Flattening struct.	-0.02
More inv. low level	0.06
Team work	0.06
Job rotation	0.03
Multitasking	0.04
<i>External flexibility</i>	
Downsizing	0.04
Outsourcing	-0.009
Back core busn	0.07
Strategic alleance	0.07
Sectoral dummies (omitted: education)	
Yes	
Country dummies (omitted: Portogal)	
Yes	
Constant	-4.03***
N° oservations	5168
Log likelihood	-2868
Pseudo R ²	0.18

Note: Statistical significance: * 10% level; ** 5% level; *** 1% level.

Results shows that, as has been found in previous studies (Osterman, 1994; Poole and Jenkins, 1998) there are some size effects in the promotion of pay policies based on the share of risk business and/or on individual/team productivity, the probability to adopt this type of remuneration system raises in larger firms (respect to smaller ones – omitted category). In addition, innovative forms of pay are more likely to be introduced as a consequence of on-the-job training activities and the introduction of flexible working time. In this context, also firm's market characteristics play a role. In fact, we report a positive and statistically significant effect to be part of larger organisation, to be a

profit-oriented establishment, to operate in competitive market as well as to have experienced in the recent past an increase in the level of competition. In other words, the increasing degree of globalisation forces firm to adopt a system of remuneration and incentives that improves efficiency and productivity. The answer to this need consist in linking wage on performance, as to force worker to be productive.

This process seems to be contrasted in particular by unions, which are traditionally against the introduction of this forms of pay. As we could expect, the fact that a workplace is covered by collective agreement disincentives the adoption of new pay practices. With respect to the set of variables related to innovations, the use of new technologies, along with the introduction of innovative products increase the probability to be innovative in pay policies. As we could expect, the introduction of ICT represent a great opportunity to increase productivity, thus encouraging the introduction of pay policies which allows to reach expected results. Most interesting for our analysis, from the inspection of table 4, the system of HPWO doesn't shows a great influence on innovative pay policies.

To better-understand the “anatomy” of this result, in the next step, we analysed the system of pay policies in a more dis-aggregated perspective. With the same set of exogenous variables, we runs three separate regression dividing the sample in three parts, according to the definitions of innovations in pay policies. The results of this exercise are shown in table 5. First of all, we consider establishment which introduced only some traditional form of pay flexibility (column 1); then, those where has been adopted some forms of pay for productivity (individually and/or tam based, column 2) but no forms of profit-related pay; finally, we consider those who introduced (also) profit-sharing and/or share of ownership schemes.

Table 4. Effects of HPWO and employment relations on different types of pay settings

Independent variables	(1) Depend variable: traditional pay flex.	(2) Depend variable: pay for productivity	(3) Depend variable: profit-related pay
<i>Firm characteristics (omitted: size less 50)</i>			
Size 50-100	0.054	0.12	0.07
Size 100-200	0.064	0.22**	0.19
Size 200-500	-0.006	0.29***	0.29**
Size 500-1000	0.046	0.21	0.37**
Size more 1000	-0.075	0.5***	0.34**
Skill intensity	0.22**	0.04	-0.04
Time flexibility	0.03	0.21***	0.16*
Training	-0.07	0.14*	0.34***
<i>Firm's market structure</i>			

Owned	-0.14	0.06	0.34***
Profit	-0.32***	0.66***	0.78***
Level of competition	0.008	0.12***	0.23***
Increase competition	0.13	0.21**	0.12
<i>Industrial relations</i>			
Density	0.26**	-0.28**	-0.18*
coverage	0.14*	-0.21**	-0.25**
<i>Innovation activity</i>			
Product innovations	-0.15**	0.22***	0.05
ICT	0.02	0.17***	0.15*
<i>HPWO</i>			
Flattening struct.	-0.007	-0.59	0.16
More inv. low level	0.17	0.04	0.19**
Team work	-0.112	0.14**	-0.09
Job rotation	0.14*	0.025	0.05
Multitasking	0.03	-0.06	0.27***
<i>External flexibility</i>			
Downsizing	-0.99	-0.21	0.12
Outsourcing	-0.009	-0.013	-0.07
Back core busn	-0.07	0.18**	-0.02
Strategic alliance	0.04	-0.04	0.22**
Sectoral dummies (omitted: education)	Yes	Yes	Yes
Country dummies (omitted: Portugal)	Yes	Yes	Yes
Constant	-1.05***	-3.44***	-5.9***
N° oservations	5168	5168	5168
Log likelihood	-2709	-2747	-2003
Pseudo R ²	0.07	0.13	0.22

Note: Statistical significance: * 10% level; **5% level; *** 1% level.

It can be noticed that in traditional pay flexibility there is no firm-size effect, both the presence of strong unions and collective agreements have a positive coefficient, incentives are based on individual characteristics (skill intensity) and provide a sort of “premium” for those low-level workers who are more involved in decisional process. In addition, firms adopting bonuses or pay-for-skill policies are less innovative than average.

Turning now to consider pay-for-productivity, as previously detected, firms size does matter (high coefficient for large establishment, possible monitoring problems). High and increasing levels of competitions in the product market increase the probability to adopt this type of pay schemes, while it makes no difference to be a part of a larger organisation. By contrast, both innovations in products and the use of ICT play a strong positive role in the probability to adopt pay methods based on productivity as well as the introduction of flexible working time. In this context, among HPWO variables, only the use of work teams play a (positive and statistically significant) role.

Turning now to consider profit-related-pay, some differences emerge. Together with the level of competition, also to be a part of a larger organisation shows a positive effect on the probability to

adopt this type of schemes. The role of new technologies is positive but, at the same time, weaker and less significant. Significant determinants of pay for performance are, first, on-the-job training activities, and, second (in the set of High Performance Work Organisation) both the involvement of low level workers in the decisional process (indicator of the progressive flattening in internal firm's work organisation) and multitasking. In the latter, as workers don't perform a single task, they can't be paid "by competence". They need some incentives to perform their work (free-raider problems) because, as multitasking produces some problems in monitoring effort; at the same time, it is difficult to link incentives to productivity (relatively unobservable if a worker perform a great variety of task). Results shows that profit-related-pay policies are the response to this problem for firms in our sample. Not differently from below pay policies don't seem to be affected by the existence of "flat" management structures.

As to summarize our results in the last part of this section will be discussed the result of a further investigation. In fact, we estimated also an ordered probit model where the dependend variable takes values from 0 to 6, according to the (growing) degree of innovativeness of establishment's pay structure. In particular, we assume that profit-related-pay policies are more innovative than those where pay is related to productivity. At the same time, the the latter are more innovative than traditional ones. In particular, the variable has been constructed as follows:

Values taken by the dependent variable (*pay flexibility*):

0 = no flexible pay practices

1 = only bonuses and/or pay-skill (trad. forms of pay flex)

2 = only some pay for productivity (pay for ind prod and/or pay for team prod.)

3 = pay for productivity and also some traditional forms of pay flex

4 = only some profit related pay schemes (profit sharing and/or share of ownership)

5 = some profit related pay and some pay for productivity

6 = some profit related pay, some pay for productivity and also some traditional pay flex

Results are shown in table 6.

Table 6 – Ordered probit estimation of pay flexibility's determinants

Independent variables	Depend variable: Pay flexibility.
<i>Firm characteristics (omitted: size less 50)</i>	
Size 50-100	0.06
Size 100-200	0.14***
Size 200-500	0.16***
Size 500-1000	0.21***

Size more 1000	0.25***
Skill intensity	0.07***
Time flexibility	0.10***
Training	0.18***
<i>Firm's market structure</i>	
Owned	0.16***
Profit	0.38***
Level of competition	0.11***
Increase competition	0.11**
<i>Industrial relations</i>	
Density	-0.12**
coverage	-0.10***
<i>Innovation activity</i>	
Product innovations	0.07**
ICT	0.11***
<i>HPWO</i>	
Flattening struct.	-0.016
More inv. low level	0.10***
Team work	0.01
Job rotation	0.09**
Multitasking	0.10***
<i>External flexibility</i>	
Downsizing	0.014
Outsourcing	-0.01
Back core busn	-0.03
Strategic alleance	0.07*
Sectoral dummies (omitted: education)	Yes
Country dummies (omitted: Portugal)	Yes
N° oservations	5168
Log likelihood	-8104
Pseudo R ²	0.087

Note: Statistical significance: * 10% level; **5% level; *** 1% level.

Results of this regression suggest that both the adoption of new technology and of some innovative forms of work organisation influence the structure of wage, in the sense that requires more innovative forms of pay where the relationship between the remuneration and indicators of performance become stronger. In particular this is true for the adoption of work practices like job rotation, multitasking and the involvement of low-level workers in decision's process - which are a set of practices associated with "flat" (Caroli et al., 1999), "olistic" (Lindberk and Snower, 1996) hierarchy. Quite surprisingly, in this context, the introduction of more flat management's structures don't have effect of reward policies. In general, the adoption of team-based work systems don't seem to require high levels of innovation in pay policies, although, previously, we noticed that this type of work practice require especially forms of pay-for-productivity to be efficiently implemented. Finally, external flexibility doesn't seem to play a significant role in new pay practices, except for the negotiations of strategic alleance with other firms (but the coefficient is rather low).

CONCLUSIONS

(to be completed)

APPENDIX: Variable definitions and means

VARIABLE	MEAN	DEFINITION
<i>Pay Practices</i>		
bonuses	0.14	Dummy (1, 0)
Pay for skill	0.4	Dummy (1, 0)
Pay for individual output	0.17	Dummy (1, 0)
Pay for team output	0.19	Dummy (1, 0)
Profit sharing	0.16	Dummy (1, 0)
Share of ownership	0.06	Dummy (1, 0)
Innovative pay (<i>dep. variable</i>)	0.42	Dummy (1, 0)
Pay for individual (<i>dep. variable</i>)	0.25	Dummy (1, 0)
Pay for productivity (<i>dep. variable</i>)	0.3	Dummy (1, 0)
Pay for performance (<i>dep. variable</i>)	0.19	Dummy (1, 0)
Pay flexibility (<i>dep. variable</i>)	1.84	Ordered (0, 6)
<i>Firm characteristics</i>		
Size less 50	0.15	Dummy (1, 0)
Size 50-100	0.2	Dummy (1, 0)
Size 100-200	0.21	Dummy (1, 0)
Size 200-500	0.21	Dummy (1, 0)
Size 500-1000	0.09	Dummy (1, 0)
Size more 1000	0.1	Dummy (1, 0)
Skill intensity	0.48	Dummy (1, 0) [high, low]
Time flexibility	0.22	Dummy (1, 0)
Training	0.28	Dummy (1, 0)
<i>Firm's market structure</i>		
Owned	0.57	Dummy (1, 0)
Profit	0.68	Dummy (1, 0)
Level of competition	2.8	Ordered (1,4) [no competition, only national, national&little foreign, both national and foreign]
Increase competition	0.69	Dummy (1, 0)
<i>Industrial relations</i>		
Density	0.46	Continuos variable (s. d.: 0.39)
coverage	0.77	Dummy (1, 0)
<i>Innovation activity</i>		
Product innovations	0.3	Dummy (1, 0)
ICT	0.45	Dummy (1, 0)
<i>HPWO</i>		
Flattening struct.	0.33	Dummy (1, 0)
More inv. low level	0.35	Dummy (1, 0)
Team work	0.28	Dummy (1, 0)
Job rotation	0.15	Dummy (1, 0)
Multitasking	0.64	Dummy (1, 0)
<i>External flexibility</i>		
Downsizing	0.26	Dummy (1, 0)
Outsourcing	0.17	Dummy (1, 0)
Back core busn	0.13	Dummy (1, 0)

Strategic alliance	0.16	Dummy (1, 0)
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