THE DIFFUSION OF PAY FOR PERFORMANCE ACROSS OCCUPATIONS

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Acknowledgements and Data Availability Statement

Abstract

In this paper the differences in the incidence of pay for performance plans between occupations in a sample of Spanish manufacturing establishments are analysed. Our results show that there are significant differences between occupations in the incidence of individual, group and firm or plant pay for performance plans. The roles of establishment size, multinational ownership and the human resource department in the incidence of pay for performance plans and their variability of use across occupations within the same firm are also studied. These factors are found to correlate to a greater use of pay for performance and, in most cases, this effect is homogenous across occupations.

The approaches to human resource management (hereafter HRM) and the employment practices adopted by employers change over time, as the circumstances that surround organizations evolve. In recent years, firms are facing an increasingly global and competitive business environment, as well as unpredictable and rapidly changing product markets. As a result, certain HRM practices are gaining popularity among employers. One of these practices is pay for performance (hereafter PFP) (Brown and Heywood 2002), which is considered to improve organizational outcomes by enhancing employee motivation and identification with the objectives of the firm (Pfeffer 1998), and by enabling flexibility within the firm's reward system.

When designing their HRM systems, organizations have to decide not only which practices they are going to adopt, but also how they are going to implement them. One of the dimensions of the process of employment practices implementation concerns their diffusion among different occupational groups of workers. While there is extensive literature on the adoption of HRM practices by organizations, less effort has been made to discern and compare the application of these practices to different occupations (Werner and Ward 2004). Despite being an underdeveloped issue, the diffusion of HRM practices among occupations has been indirectly tackled in the past. Hence, some studies assume that HRM practices are uniformly applied to the entire workforce within an organization (Huselid 1995; Snell and Dean 1992). Other analyses focus on the examination of the implementation of these practices for a certain occupation, wherein the "core" or largest occupational group within the organization is most frequently considered (Batt 2002; Forth and Millward 2004). However, a body of research that advocates the differential application of HRM practices to different types of jobs has emerged in recent years. This stream of research maintains that the specific contributions of different groups of employees to the objectives of the firm result in variability in the application of HRM practices among them (Lepak and Snell 2002).

In light of recent developments in the field, the objective of this paper is to contribute to the analysis of the use of PFP systems, paying particular attention to their diffusion among groups of workers. Two questions are addressed in this regard. First, to what extent does occupational category influence the implementation of PFP systems within establishments? The *agency theory* suggests that occupation certainly has an effect on the design of PFP systems within establishments.

The second question is related to *strategic pay* and concerns whether or not the use and variability of use between occupations of PFP are influenced by contingent factors such as the size of the establishment, the presence of a human resource department (hereafter, HR department) and foreign ownership. More precisely, our aim is to examine not only how the factors mentioned shape the use of PFP, but also if their effect varies across occupations within the same firm. In contrast to agency theory and the strategic pay arguments, *the best practices approach and institutional theory*, among others, suggest that occupational status and the contingent factors previously mentioned are not significant determinants in the use of PFP.

The analysis is based on a newly-created Spanish data set that contains information on the use of PFP for various occupational groups of workers within the same establishment. Our empirical strategy consists in studying the determinants of the use of any PFP, as well as three particular systems: pay linked to individual performance (hereafter IPFP), group performance (hereafter GPFP) and plant or firm performance (hereafter FPFP). The following occupations are considered: top executives, professionals, middle managers, administrative workers, sales employees and production workers.

Theoretical approaches to the diffusion of PFP across occupations

Despite the fact that literature on the topic is scarce, we can gain an insight into the diffusion of HRM practices through the examination of related bodies of research. Hence, some theoretical approaches to HRM suggest that work practices are uniformly applied to the entire workforce within an organization. One of these is the *best practices approach*, which defends the universality of high-involvement practices (Pfeffer 1998). According to this literature, there is a set of practices whose adoption generates benefits for organizational performance irrespective of the particular characteristics of the firm; PFP is one such practice. From this perspective, it can be inferred that PFP will be homogeneously implemented across occupational groups of workers.

An *economies of scale* point of view can also help us to understand the pattern of PFP use within establishments. The adoption of these systems implies the assumption of fixed costs in implementation. If they are applied to more than one group of workers, the fixed costs can be spread over more employees. Therefore, it is plausible to conclude that establishments may be more inclined to adopt a PFP scheme if they can apply it to various occupations. Similarly, establishments that have already carried out a PFP plan for an occupation will find it easier to extend it to other groups of workers (Jirjahn and Stephan 2004).

According to the *bargaining theories* of wage determination, if an organization generates rents and employees possess some bargaining power, they can fight for a share of those rents. As stated by these theories, it is possible that the worker's power to appropriate firm rents leads to a high correlation in the level of wages between occupations. This may be due, for example, to the fact that the bargaining power of workers is uniform across job categories, or that employees band together in order to exert more pressure on the employer (Groshen 1991). A dimension of the bargaining theory that is relevant for our analysis is the influence that trade unions have on the implementation of PFP. It is often argued that trade unions oppose the discriminatory

application of pay systems across employees, which suggests that they will favor the uniform adoption of pay practices for different occupations.

Finally, *institutional theory* emphasizes how institutions shape the structure of an organization (DiMaggio and Powell 1983). In order to survive and gain legitimacy, organizations adapt to the institutional environment in which they operate. Adaptation to the institutional environment leads to a process of isomorphism, that is, a resemblance between the organizations of a population. In light of this theory, a convergence towards homogeneous HRM practices such as PFP across organizations may be expected. The process of isomorphism could extend to comparisons between groups of workers, leading to similarities in the use of PFP for different occupations.

A contrasting perspective advocates the differential application of HRM practices to different groups of workers. This line of research maintains that the specific contributions of groups of employees to the objectives of the firm result in variability in the application of HRM practices within organizations. Among the existing studies in this field, the work of Lepak and Snell (1999) is worth mentioning. These authors made use of the human capital theory, the resource-based view of the firm and transaction costs economics to support the idea that the practices of HRM applied to a group of employees depend on the particular features of the group. Their argument may be explained as follows. The human capital of an organization can be classified according to their value and uniqueness to the firm, which results in the establishment of different employment modes within the organization, each of which is associated with a particular type of employment relationship. As a result, organizations apply specific HRM practices to each group of employees within the firm depending on the employment relationship established between the group and the employer. One of the dimensions of HRM that is specifically cited by Lepak and Snell (1999) concerns compensation issues. The agency theory

also points to a specific design of compensation systems for each occupation (Eisenhardt 1989). According to this theory, incentive design depends on how work is organized. To the extent that work organization varies across groups of workers, one can expect differences in the use of PFP between occupations. In line with these arguments, Baron and Kreps (1999) defended the need to design appropriate compensation systems for the different occupational groups of workers present within organizations. The authors stated that the determination of the level, basis, distribution and form of compensation often involves formal job analysis and evaluation, because each job is characterized in terms of various common dimensions and distinctions, such as the types and complexity of knowledge required, the number of employees supervised, the amount of capital overseen, the type and unpleasantness of working conditions, and so on. Overall, this stream of research suggests that we might find differences in the implementation of PFP across occupational groups of workers due to their different contributions to establishment performance and their specific job characteristics and functions within the organization.

Review of the empirical evidence on the diffusion of HRM practices across occupations

In this section, we summarize existing evidence of the diffusion of HRM practices across groups of workers. In order to gain more insight into the diffusion of pay practices in particular, considerable attention is paid to the research that has focused on the consistency of wage levels within organizations.

Lepak and Snell (2002) used data from 148 publicly traded companies in order to compare how HRM practices were used when managing groups of employees that contributed in different ways to organizational competitiveness. The results showed that the implementation of HRM systems varied across groups with different value and uniqueness to the firm.

Lepak, Taylor, Tekleab, Marrone, and Cohen (2007) empirically tested whether the implementation of high-involvement HRM systems within firms was always greater for core employees in comparison with support workers. The authors found no evidence in favor of this hypothesis, while their results revealed that the industry sector influenced the use of high-involvement HRM systems for the two groups of workers in comparative terms.

Melian-Gonzalez and Verano-Tacoronte (2004, 2006) used questionnaire information obtained from human resource managers in Spanish companies to compare the application of best human resource practices for four groups of employees. The results showed significant differences among groups, which contradicts the universalistic approach to HRM.

We now turn to the examination of studies that analyze the consistency of pay levels across groups of workers within organizations. Exploring United States data on wage structures taken from the Bureau of Labor Statistics, Groshen and Krueger (1990) found the existence of an important correlation among groups of workers within hospitals.

Bronars and Famulari (1997) used data on white collar workers from the Bureau of Labor Statistics in order to analyze variation in wages within and across establishments. The authors noted the existence of positive and significant correlation coefficients between professional and non-professional workers across establishments..

Cardoso (2000) examined the uniformity of pay levels in Portuguese firms using information on very contrasting occupations. Controlling for workers' human capital characteristics, the hypothesis of the existence of a consistent pay level within firms was supported by the empirical results.

A more recent study by Gerlach and Stephan (2006) investigated the stability of wages among occupations. Their results supported the consistency of wage policies within firms, even after controlling for occupational and firm characteristics.

The occupation as a determinant of PFP use

The main objective of this study is to analyze the relationship between the occupational category and the use of different systems of PFP. In order to do so, we examine the attributes of an occupational group that could influence the adoption of incentives systems. Drawing on the agency theory and the literature on the PFP determinants, we focus on the following features of an occupational group: measurability of performance, risk attitudes, information asymmetries, degree of autonomy, variety of tasks, teamwork and co-operation, and influence on the performance of the establishment.

A necessary condition for the use of PFP as an incentive mechanism is that the performance of an employee can be measured (Prendergast 1999). The nature of the work deployed by an occupational group of workers affects the ease of measurement of their performance and, as a consequence, it influences the possibility of adopting PFP. In other words, it will be more likely that an employer adopts PFP when worker's performance can be observed. Besides the measurability of performance, there are other attributes that could influence the use of PFP schemes. The standard agency model assumes risk neutrality for the principal but risk aversion on the agent's part (Gibbons and Waldman 1999). Following this idea, one can derive that risk tolerant workers will receive PFP with a higher frequency than those employees less willing to take risks. Given that there might be a correlation between occupational choice and the worker's risk aversion (Bonin, Dohmen, Falk, Huffman, and Sunde 2007), the latter variable should be taken into consideration when analyzing the diffusion of PFP systems across occupations. Information asymmetries between workers and employers result in agency costs for the latter. The extent of these information asymmetries may vary depending on the nature of the job, so they are also an attribute worth considering when analyzing occupational differences in

the use of PFP. Another relevant attribute is workers' autonomy. Autonomy exacerbates the moral hazard problem, which might be reduced through incentive provision (see Holmstrom 1979). More precisely, it is argued that the adoption of IPFP is more likely when the autonomy of workers is high (Barth, Bratsberg, Hægeland, and Raaum 2008). For those employees who work in teams, individual performance may be difficult to measure. As a consequence, the systems that link pay to collective performance may be well suited when teamwork and co-operation among workers are required (Jirjahn 2002). A similar argument can be applied to those jobs characterized by a variety of tasks. When different tasks need to be remunerated, it is difficult to find an individual measure that reflects overall performance (Jirjahn and Stephan 2004). Under these circumstances, GPFP and FPFP will be used more likely. Finally, the influence of a worker's job on the performance of the establishment is also an attribute worth considering. For certain occupations, organizational performance is very sensitive to individual effort, and this may favor the use of plant or firm level incentives as a motivation device (Ortin-Angel and Salas-Fumas 1998).

The occupations included in our study present differences regarding the attributes described above. In order to obtain information on these attributes we use two main sources. The first one is the Occupational Outlook Handbook (U. S. Bureau of Labor Statistics 2012), a publication of the United States Department of Labor that describes what workers do on the job, their working conditions, the training and education needed, the earnings, and the expected job prospects for a wide range of occupations. The second one is the International Standard Classification of Occupations (International Labour Office 2008) published by the International Labour Organization. This classification presents information on occupational categories using a classification system based on the skills needed to perform the job.

The first group of workers analyzed in this study is the top executives. The type of work performed by this occupation is characterized by a substantive degree of autonomy and the combination of a variety of tasks. According to the Occupational Outlook Handbook, top executives are in charge of the design of the strategies and policies necessary to achieve the objectives of the organization. Given that top executives have substantial discretion in the way they perform their job and a high degree of responsibility in the organization, we expect that the workers hired for this type of position show a high willingness to take risks. The tasks performed by the different top executives that compound an organization are interdependent, so teamwork and co-ordination are also required (Main, O'Reilly III, and Wade 1993). Regarding qualification needs, top executive positions usually demand high education and experience, as well as specific skills such as leadership, confidence or ability to communicate effectively.

Taking all these features into account, we expect that top executives receive PFP with a high frequency. The variety and complexity of tasks carried out by top executives as well as their substantive autonomy and empowerment suggest that it will be difficult to monitor their effort. In addition, they are expected to be less risk averse than workers occupying lower positions in the organizational hierarchy. According to the arguments presented at the beginning of the section, we expect that the job autonomy is associated with IPFP. Moreover, the variety of tasks carried out by these employees suggests that they will receive collective pay systems such as group and firm incentives (Jirjahn 2002). As we have mentioned, teamwork and co-operation are also required in top executive positions, which reinforces the idea that they will be remunerated using GPFP. Finally, their performance has a strong influence on the results obtained by the establishment, so we expect to observe a high incidence of plant or firm incentives for this occupational category.

Middle managers are in charge of the planning, control and co-ordination of production teams. They monitor production and set programs to supervise the quality of output. According to the Occupational Outlook Handbook, they collaborate with other managers in order to put into practice the policies of the organization. Mid-level qualifications and a considerable experience are commonly needed. Taking into account all these attributes, we hypothesize that middle managers will be frequently remunerated using PFP. The degree of autonomy required to perform this job suggests that it is likely that middle managers receive pay for individual results. However, the work carried out by middle managers might be difficult to measure in individual terms due to features already described, such as their various managerial duties. Therefore, it is possible that they receive pay linked to subjective rather than objective measures of individual performance determined by managers at a higher level. Alternatively, their pay could be based on measures of collective performance. From the agency theory perspective, we expect that the use of FPFP is lower for middle managers than its adoption for top executives. The reason is that the connection between effort and establishment performance is less straightforward as we move down the organizational hierarchy (O'Shaughnessy 1998). As O'Shaughnessy (1998) points out, other collective pay schemes such as GPFP could be more useful when trying to motivate these workers. This idea is reinforced by the fact that the middle managers' job consists of a set of different tasks and they need to co-operate with other managers and heads of departments.

Professional workers carry out functions that contribute to the fulfillment of the objectives of the different organizational areas. They are involved in activities such as developing operational methods, gathering information on competitors, goods and services, assessing customer needs or designing and implementing recruitment and training programs. The qualification requirements of the group are high: according to the International Standard Classification of Occupations, they belong to the highest skill categories. To the extent that their

contribution is relevant for organizational success and the creation of a competitive advantage, they will be frequently managed using incentive pay. As a consequence, we expect that they receive FPFP, although the frequency will be probably lower than the one observed for top managers. Moreover, the significant degree of autonomy of professionals over their work points to a high incidence of IPFP for this occupation. However, information asymmetries may exist between professionals and their managers, giving rise to agent opportunism. If this is the case, the use of IPFP might be low for this type of workers due to existing contractual difficulties. Hence, the adoption of this particular system cannot be precisely anticipated.

One of the categories that compound an industrial establishment is the group of administrative workers. The functions carried out by this occupation mainly consist in clerical duties, support tasks and information management. The administrative functions are commonly standardized and well determined. As a result, they enjoy low autonomy regarding the tasks performed, the pace of work or the planning and organization of their duties. Experience and basic administrative skills are valued but not essential, since it is possible to learn on the job. Administrative workers do not work in teams or need to co-operate with other employees with a high frequency. Moreover, their direct contribution to organizational performance is not clearly identifiable, since they are devoted to support the work of other occupational groups. All these circumstances suggest that they will be managed using complex HRM practices such as PFP with a lower probability than the rest of occupations mentioned. When remunerated using incentives, the individualistic nature of these jobs makes us think that they will receive IPFP. On the contrary, we do not expect to find a high incidence of GPFP and FPFP for administrative workers.

Sales employees promote and sale the merchandise of the establishment. They may also be in charge of other activities such as preparing reports or analyzing statistics. There are no

specific qualification or experience requirements for these positions, but certain skills such as interpersonal relations or the ability to sell products are needed. The nature of their job promotes the adoption of PFP, since the performance of sales workers is easily identifiable. Moreover, they spend part of their working hours outside the establishment, which gives rise to information asymmetries. The ease of measurement of individual performance suggests that PFP for sales workers will be mostly linked to their individual performance. Attributes such as a variety and complexity of tasks or a strong link with organizational performance are not observed for sales workers. Consequently, it is not likely that they receive compensation schemes that link their pay to group, plant or firm performance.

Finally, production workers perform manual tasks related to fabrication, assembling or operating machinery, among others. They participate in routine activities and their work is determined by the nature of the production process. As a result, production employees have low freedom to influence their productivity levels and the course of their work in comparison with occupations at higher hierarchical positions. According to agency theory, optimal incentives are low powered when performance is not excessively sensitive to changes in effort. In addition, the type of job effected by production workers enables direct monitoring by a supervisor or straightforward appraisal due to the nature of the production process, thus reducing the need for alternative incentive mechanisms. In light of these features, we do not expect to find a high incidence of PFP for this occupation. However, production workers have been traditionally remunerated using piece rates, a particular type of IPFP. The reason for this might be that their performance is easily measured individually due to the nature of production.

Size, foreign ownership and HR department

Besides the occupational group, there are other variables that may influence the adoption of PFP systems at the establishment level. In particular, structural contingency theory posits that the adoption of human resource practices by an organization depends on its contingencies (Delery and Doty 1996). This theory broke away from the universalistic perspective, which holds that there is only one effective way to organize. On the basis of this theory, it may be inferred that the design of PFP systems responds to strategic pay concerns. There is a significant body of research analyzing the determinants of the adoption of PFP systems using establishment data. Taking into account this research, we can gain an insight into the contingency factors that have an effect on the use of PFP. In particular, it has been shown that establishment size, membership in a multinational company and the existence of a HR department may influence the employer's decision to adopt PFP plans.

Regarding the impact of the size of the establishment, this variable might influence both the probability of using PFP and the type of scheme adopted. On the one hand, the fixed costs of implementing a PFP system are spread over more employees when the establishment is large, supporting the idea that the likelihood of implementing such a system will increase with the size of the establishment. Moreover, large establishments more frequently own or have access to the technology and knowledge necessary to develop PFP (Long and Shields 2005). On the other hand, there is a free rider problem associated with the use of group incentives, a problem that is exacerbated as the size of the establishment increases (Hansen 1997). Therefore, we can expect that the influence of the size of the establishment varies depending on the compensation system that we take into account. In addition, it is plausible to think that the impact of the size of the establishment varies across occupations. The size of the establishment is associated with the existence of economies of scale in the implementation of HRM practices. Turning to the

arguments presented before, the adoption of PFP is more likely when the fixed costs are spread over a high number of employees. The number of workers belonging to each occupation increases if the establishment has a high total number of workers. Hence, in large establishments, the employer can adopt a system of PFP for only one occupation and still benefit from the economies of scale factor. According to this idea, our intuition is that the size of the establishment may influence positively the differential application of contingent pay across occupations.

Regarding the adoption of PFP in foreign-owned companies, multinationals operate in different countries, where they can encounter diverse institutional settings. Since they operate in dispersed locations, there is a cultural distance between the headquarters and the subsidiaries that may enhance the misalignment of incentives between owners and the occupational groups at the different branches (Roth and O'Donnell 1996). Besides this cultural distance effect, there is also a geographical distance between centers, so direct monitoring of workers' performance might be difficult and costly. If a subsidiary or a group of subsidiaries are faced with this monitoring problem, they can resort to the use of PFP as an incentive mechanism. Large multinational companies have to coordinate across their many locations in order to achieve goal coherence and incentive alignment, so the use of PFP by some subsidiaries could be spread among the different branches of the corporation. Consequently, membership in a multinational corporation may promote the adoption of PFP systems.

We also expect to find an influence of the foreign ownership on the diffusion of PFP plans across occupations, although this effect is theoretically ambiguous. On the one hand, there is a high incidence of high-involvement HRM practices in multinationals (Geary and Roche 2001). According to the best practices approach, these practices are universally beneficial for organizations, so this would favor a uniform adoption of PFP systems across occupations in

multinationals. On the other hand, since multinationals have access to extensive knowledge concerning HRM, they may implement more sophisticated HRM systems consisting of a differential adoption of HRM practices across groups of workers.

Finally, the literature on HRM has found evidence in favor of the idea that the presence of a department dealing with HRM issues in an organization has a bearing on the implementation of HRM practices. In particular, the existence of a HR department might facilitate the adoption of sophisticated practices such as PFP (Shaw, Kirkbride, Tang, and Fisher 1993). This prompts the conclusion that the use of contingent compensation schemes will be more likely in those establishments where a HR department is present. The presence of a HR department could also influence the diffusion of PFP systems across occupations. On the one hand, the existence of a HR department indicates that the establishment considers human resources to be a fundamental assetIn other words, they will manage human resources groups paying considerable attention to their particular features and contributions to organizational objectives. As Brown and Heywood (2005) point out, the presence of HR specialists may be indicative of the need to specialize the tasks of managers in order to deal with particular problems. If this is the case, we can expect that the existence of the HR department favors a differential use of PFP plans across occupations. On the other hand, the HR department has also been associated with standardization and formalization of HRM practices (Brown and Heywood 2005). If the HRM policy adopted favors the standardization of practices, this can affect the adoption of PFP systems for the different occupational groups that constitute an establishment. Under this assumption, the presence of a HR department could reduce the differences in the incidence of PFP systems among occupations.

Methodology

Data

The data was gathered in 2006 through personal interviews with managers in Spanish manufacturing plants with fifty or more employees, and represents a unique source of information about a range of human resource practices in Spanish firms. Information was collected at the plant level, as this is the unit at which decisions about the implementation of the practices of interest are taken. Furthermore, knowledge of the issues included in the questionnaire is expected to be greater at plant level and, as a consequence, the data obtained should be more reliable.

The process of development of the data base was as follows. Once the objectives and scope of our study were defined, and in order to properly design the questionnaire, a thorough examination of the literature related to the purpose of the project was carried out. With the information gathered, a first draft of the questionnaire was drawn up jointly by the members of the research group and the firm in charge of the fieldwork. The questionnaire was pre-tested in nine plants and then modified in several ways to come up with its final version. The data was drawn from personal interviews with one of the managers at the plant. It was thought that questions should be addressed to the general manager or to the human resource manager. In practice the human resource manager was the figure most frequently interviewed.

The range of potential respondents for the purposes of the survey comprised all Spanish manufacturing establishments which had fifty or more employees in 2005. After stratification by sector, size and location, a random selection of workplaces was obtained from the Spanish Central Directory of Firms (Directorio Central de Empresas, DIRCE) of the Spanish National Statistics Institute (Instituto Nacional de Estadistica, INE), using data from 2005. The interviews with those managers that agreed to answer our questionnaire were performed by specially-trained

professionals in computer-assisted telephone interviews (CATI). The establishments were first approached by letter or email, indicating the goals of the survey and including a copy of the questionnaire.

A total of 2933 establishments were contacted, from which 1001 valid interviews were completed. This final number of interviews matched expectations regarding the size of the data set, yielding a response rate of 34.1 percent. The distribution of the establishments sampled across industrial sectors and size intervals is described in Table 1[1].

{{Place Table 1 about here}}

Regarding the specific information about incentives obtained by the questionnaire, managers were asked whether different systems of PFP were used for at least 50 percent of the employees in each of the following occupational groups (representative of the hierarchical structure of a typical manufacturing establishment): top executives, middle managers, professionals, clerical workers, salesmen and production workers. In particular, the questionnaire enquired about the use of general PFP and three particular systems: IPFP, GPFP and FPFP. As a result, we obtained data on the use of these PFP systems for six occupational categories in each establishment.

Because some of the interviews did not provide information on some of the issues of interest, the final sample of establishments used in the estimations is between 800 and 815 (the number of establishments with missing variables differs according to type of PFP scheme). Since the main purpose of the analysis is to examine the variability of PFP schemes among both

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[1]In order to examine if our sample is representative of the population of Spanish manufacturing establishments with 50 or more workers, we have performed chi-square tests. The sample is stratified by size (establishments between 50 and 99 workers, 100 and 499 workers, and 500 or more workers) and industry (12 manufacturing sub-categories), so we have compared the sample and the population across size intervals and industry categories. The results of the chi-square tests suggest that there are not statistically significant differences between the sample and the population neither for the size dimension nor for the industry dimension (p-values of 0.490 and 0.999, respectively).

occupations and establishments, we have pooled the data as follows. Six occupations are analyzed in 815 establishments, totaling 4890 observations (6 x 815). However, 390 establishments did not have salesmen in their workforce, so the final number of observations is 4500 (4890 – 390).

Estimation method

The dependent variable relates to the type of incentive pay system in operation for the majority of employees in a particular occupational group in a given establishment. Since the dependent variable is dichotomous, we use logit models. The specification of our model for a particular PFP scheme is as follows:

$$(1) \ \ \mathrm{Prob}(y_{it} = 1) = L(\mu + \alpha_i + \beta_1 s_j + \beta_2 m_j + \beta_3 h_j + \gamma' x_j + \delta z_{ij}),$$

where i denotes occupation and j denotes establishment and L(-) is the logit function. The dependent variable y_{ij} represents whether the PFP scheme is used for 50 percent or more workers of occupation i in establishment j. In the model, there is an occupation-specific effect, that is, an effect that does not vary across establishments and accounts for any occupational impact on the use of PFP. Because we are interested in estimating this occupation-specific component, a dummy variable is included for each of the six occupations considered except the one used as a reference (i.e. production workers).

The specification includes three variables representing the establishment features we want to register in our analysis: size of the establishment (s_j), membership in a multinational corporation (m_j), and existence of a HR department (h_j). The vector x_j includes other features of the establishment that we want to control for in the estimations, i.e. number of competitors, technological change, trade union's influence, establishment's strategy, export propensity and

manufacturing sector. Note that the x_j vector only includes variables that vary across plants but not across occupations. Finally, the number of employees in each occupational group in each establishment is also included, as a percentage of all employees in the sample, z_{ij}. This variable varies both across occupations and establishments, and is intended to control for the size of the occupational group in the analysis of PFP use. Group size may influence PFP adoption because there are fixed costs associated with the implementation of such practices for a specific occupation.

We also estimate alternative specifications that include interaction terms between each establishment feature of interest and the occupational dummies. These specifications allow us to test whether the effects of establishment size, membership in a multinational corporation, and existence of a HR department vary across occupations. We have chosen to include the interaction terms of each establishment variable separately because this specification will allow us to observe the full effect of each group of interactions on the dependent variables. The joint estimation of the whole set of interactions and their interpretation could be misleading since, for example, the size-occupation effect might be partially operating through its indirect influence on the HR department-occupation and the multinational-occupation effects[2].

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[2] The augmented versions of Equation (1) with the interaction terms are the following:

$$(2) \quad \text{Prob}(y_{it} = 1) = L(\mu + \alpha_i + \beta_1 s_j + \beta_2 m_j + \beta_3 h_j + \gamma' x_j + \delta z_{ij} + \theta' \alpha_j \times s_j)$$

where L(-) is the logit function and we include interactions between size and the occupational dummies,

$$(3) \quad \text{Prob}(y_{it} = 1) = L(\mu + \alpha_i + \beta_1 s_j + \beta_2 m_j + \beta_3 h_j + \gamma' x_j + \delta z_{ij} + \theta' \alpha_j \times m_j)$$

where L(-) is the logit function and we include interactions between foreign ownership and the occupational dummies, and

$$(4) \quad \text{Prob}(y_{it} = 1) = L(\mu + \alpha_i + \beta_1 s_j + \beta_2 m_j + \beta_3 h_j + \gamma' x_j + \delta z_{ij} + \theta' \alpha_j \times h_j)$$

where L(-) is the logit function and we include interactions between HR department and the occupational dummies.

Since the models include variables measured at the plant level, it is possible that the error terms are correlated within establishments. In order to control for this possibility, we cluster the errors at the plant level when estimating the different equations previously described.

Variables

In what follows, we describe the measures used in our empirical exercise (see Table 2). With the information provided by the questionnaire regarding PFP usage, we constructed four dependent variables. These variables are dichotomous and indicate whether or not general PFP, IPFP, GPFP, and FPFP are used for 50 percent or more workers of a particular occupation in an establishment.

{{Place Table 2 about here}}

Regarding the independent variables, they can be grouped into two categories that correspond to the theoretical approaches cited in the first sections of the paper. First, we include six dummies representing the different occupations mentioned in previous sections. With these dummies, we want to test the predictions of agency theory, that is, whether or not a different implementation of PFP systems between occupations is observed. We also include variables that correspond to the idea of strategic pay and represent the features of the establishment we want to account for, i.e. plant size, foreign ownership and existence of a HR department. Establishment size is measured by means of three size-range dummies: 50-99, 100-499, and 500 or more. Respondents of the questionnaire were asked whether the plant was part of a multinational corporation. From this question, we derived the variable *Multinational*, which equals one if the establishment is foreign-owned, and zero otherwise. Managers were also asked about the presence of a specific department dealing with HR issues in the organization. Using their

responses, we created the variable *HR Department*, taking value one if such department exists and zero if it does not.

A set of control variables is also included in the analysis. First, we take into account the age of the establishment, which has been singled out as a potential determinant of the adoption of PFP. According to Stinchcombe (1965), the practices adopted by an organization depend to a great extent on the resources available when that organization is founded, and they only change in times of crisis. Hence, an establishment might use PFP depending on its age, which reflects the resources that were available at the moment the plant was created. In particular, it is possible that age captures different cohorts of beliefs about 'best practice'. The effect of establishment age is measured by means of three age-range dummies: less than 20 years, 20-39, and 40 or more.

The degree of competition in the product market could also have a bearing on the use of PFP schemes. In particular, intense competition may promote the use of PFP as a means of controlling labor costs (Drago and Heywood 1995; Heywood, Huebler, and Jirjahn 1998; Barth et al. 2008). On the other hand, Bayo-Moriones and Huerta-Arribas (2002) find a negative correlation between intensified competition and the use of production incentives in Spain. The interviewees evaluated the degree of competition in the market where the establishment operates. Using this information, we constructed an ordinal-scale variable ranging from value one (no competitors) to value five (many competitors).

Technological change may also influence the use of PFP. In particular, it causes a revision in pay systems and brings uncertainty to profits (Heywood and Wei 1997; Heywood et al. 1998). Consequently, it is expected that this factor makes the use of certain types of incentives less likely. A questionnaire item provided information about the extent of technological change in the establishment. Specifically, respondents were asked whether, during the three previous years, there were no technological changes in the establishment, minor changes, significant changes,

major changes, or a complete change of the production system. Using this information, we constructed the ordinal variable *Technological Change* ranging from one (no changes) to five (total change).

It is commonly believed that unions oppose the introduction of PFP systems (Heywood, Siebert, and Wei 1997). However, and according to the empirical evidence, the influence of unions seems to vary with the type of PFP scheme considered (Long and Shields 2005; Barth et al. 2008). Questionnaire respondents were asked to evaluate the influence of unions on the establishment on a scale from one (very low influence) to five (very high influence).

Business strategy may also shape the use of incentive pay by establishments, since it is related to the prevalence of certain forms of compensation (Drago and Heywood 1995). One of the questions included in the survey examines the strategic priority of the plant. Accordingly, we include four binary variables in the analysis corresponding to cost, quality, flexibility, and innovation.

The percentage of sales exported to international markets is also considered to be a relevant determinant of PFP adoption. Long and Shields (2005) find a positive influence of the propensity to export on the incidence of PFP, and suggest that this relationship may be due to the fact that exporting firms use incentive schemes in order to improve their productivity and compete in an international context. We include in the analysis a variable that represents the percentage of exports out of the total sales of the establishment.

Finally, features of the production process could also shape the use of PFP. Previous studies have taken this into account and introduced industry controls in their analyses (Long and Shields 2005; Barth et al. 2008; among others). We consider twelve dummy variables

representing manufacturing subcategories in order to account for industry specificities[3]. In addition, we use the variable *Occupational Percentage* to control for the percentage of workers in the occupational group under consideration over the total number of employees in the establishment.

Results

Preliminary analysis

Before estimating the equations of interest, we examine the incidence of PFP for each occupational category of workers (see Table 3). In the first column of the table, we observe that sales employees is the group that most frequently receives PFP (63 percent of workplaces in our final sample), followed by top executives (54.9 percent of workplaces), middle managers (44 percent of workplaces) and professional workers (42.4 percent of workplaces). Production workers (31 percent of workplaces) and administrative workers (25 percent of workplaces) close this classification. The use of IPFP reproduces the same pattern, with sales workers in the top position (49.3 percent of workplaces) and administrative workers coming in last place (14.2 percent of workplaces). In the case of GPFP, the ranking of occupations differs from that of the previous scheme: the top executives occupation shows the highest frequency of GPFP use (15.3 percent of workplaces). However, our data reveals that there are not large differences in the percentage of workplaces using GPFP for the different occupations, with figures that vary between 15.3 percent for top executives and 11.4 percent for sales workers. The administrative workers category is an exception in this regard, displaying a very low diffusion of this scheme (6.9 percent of workplaces). As far as FPFP is concerned, it should be noted that the use of this

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[3] The manufacturing subcategories taken into account are the ones displayed in Table 1.

system is greater for high-level occupations and diminishes for workers lower on the hierarchical scale. Hence, top executives is the occupation with the highest incidence of this pay scheme (27.2 percent of workplaces), followed by professionals (17.7 percent of workplaces), middle managers (16.2 percent of workplaces) and sales workers (14.0 percent of workplaces). At the lower end of the classification are administrative (10.2 percent of workplaces) and production workers (9.7 percent of workplaces).

{{Place Table 3 about here}}

Table 4 provides a descriptive portrait of the intra-establishment diffusion of the different PFP schemes. This table displays the percentages of establishments providing PFP for zero to six occupations.[4] The general pattern we observe is that very few establishments use PFP schemes for most of the occupations, and the schemes that link pay to collective performance are especially rare.

{{Place Table 4 about here}}

Regression results

In what follows, the results of the empirical analysis are described. Tables 5 to 8 present the results of the regressions for the general use of PFP as well as the three particular systems analyzed. Each table includes the estimations of five logit models with standard errors clustered at the establishment level. In Model 1 we exclude from the analysis those variables that are potentially endogenous. We use this specification in order to observe the total effect of the exogenous regressors on the use of PFP, thus facilitating the interpretation of the results. In

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[4] Since the percentage of establishments using performance pay for five and six occupations is very low, we have grouped both categories into one. This reduced percentage is in part due to the fact that some establishments do not have any salesman among their workers (396 establishments).

addition, it is possible that there are underlying factors leading to the determination of both the dependent variable and one of these potentially endogenous variables. This may be observed in relation to the setting up of a HR department and the use of PFP, since both variables may be jointly driven by unmeasured factors. Hence, establishments concerned about the importance of efficient human resources management could choose to create a HR department and implement high performance practices such as PFP. It could also be the case that employers have to deal with problems of internal control, so they establish a department with specialists in human resources and use PFP as a way of improving the internal control issue. The second model accounts for the occupational dummies and all the establishment characteristics as explanatory variables, and the other three models include the interactions between the occupational variables and size of the establishment (Model 3), membership in a multinational company (Model 4) and existence of a HR department (Model 5). In order to link the description of the results with the theoretical approaches to the use of PFP, each table and model displays, first, the set of occupational dummies in the first place (which are used to test the predictions of agency theory); second; the variables related to strategic pay; and third, the control variables.

We begin by examining the predictions of agency theory. In order to do so, we look at the occupational dummies included in Tables 5 to 8, as well as the Wald tests of equality reported in Table 9. Regarding the use of any PFP (see Table 5), Model 1 shows that the estimated effects for the occupational dummies are all highly significant and, with the exception of the administrative workers category, of a positive sign. These results are replicated in the second model, with the only exception that the administratives effect loses significance. The high significance of the results supports the idea that occupation is a relevant determinant of PFP use, thus backing up the predictions of the agency theory presented in the previous sections of the paper. The sign of the marginal effects indicates that, with the exception of administrative employees, the remaining

occupations have a higher probability of receiving PFP in comparison with production workers. Regarding the magnitude of the results, we observe that sales workers are around 38 per cent more likely to receive PFP than production workers. They are followed by the top executives category, which displays a probability of 30 per cent in comparison with the reference group. Finally, the professional and middle manager workers are 17.9 and 19.6 per cent more likely to be paid for performance with respect to production employees.

{{Place Table 5 about here}}

In order to gain more insight into the influence of the occupational variables, Wald tests of equality between pairs of occupations were carried out (see Table 9). With these tests, we want to assess whether there are statistically significant differences between the estimated effects for the five white collar occupations considered in our analysis. The first column of Table 9 displays the results of the tests corresponding to the general use of PFP. As may be observed, the statistics are mostly highly significant, which reinforces the hypothesis that the implementation of PFP schemes varies across groups of workers. According to the results shown in the table, sales workers is the white collar occupation with highest use of PFP, followed by top executives. On the other hand, the administrative workers group is the one with lowest adoption of PFP, since we observe that all white collar occupations have a higher probability of using general PFP in comparison with this group of workers. Finally, there are no significant differences in the adoption of PFP between professionals and middle managers.

When we examine the results obtained for IPFP, we observe that they are similar to those obtained for the use of any PFP (see Table 6). With the exception of administrative workers, the occupational dummies are highly significant and of a positive sign. Again, the estimations show that white collar workers, with the exception of the administrative group, are more likely to be remunerated using IPFP in comparison with blue collar employees. According to Model 2, being

a sales worker increases the probability of receiving this particular pay scheme by 34 percent, whereas top executives are 20 per cent more likely to be paid for individual performance in comparison with production workers. The large marginal effect displayed by sales workers may confirm the results of the preliminary analysis, which showed a high incidence of IPFP for this occupation. The estimated effects for professionals and middle managers are slightly above 10 percentage points with respect to the reference group.

{{Place Table 6 about here}}

Turning to the results of Table 9, the differences between white collar occupations are also statistically significant with the exception of the professionals-middle managers pair. According to the table, sales workers are the employees who are most likely to receive IPFP, followed by top executives. In this case, the difference between the coefficients of both occupations is higher in comparison with the difference observed for the use of any PFP plan (see Tables 5 and 6). Finally, the coefficients of all white collar occupations are higher than the coefficient obtained for administrative workers. Overall, the results shown in Tables 6 and 9 provide further support for the implications of agency theory, that is, the differential use of PFP between occupations due to work organization concerns.

Regarding the use of pay linked to group results (see Table 7), these are also in line with the ideas derived from agency theory, although in this case the effects of the occupation variables are weaker compared to their incidence on the pay schemes previously described. Top executives and middle managers display a higher probability of receiving GPFP in comparison with production workers (7.0 and 6.0 percentage points, respectively). For the rest of the occupations, the marginal effects estimates do not show any significant effect on the dependent variable. The lower incidence of the occupational variables on the use of this pay scheme could be explained by its scant diffusion in the Spanish manufacturing industry. The Wald tests displayed in the third

column of Table 9 confirm that not all the coefficients estimated for the white collar occupations are statistically different from one another. An interesting result is that the differences between administrative workers and the other categories are always significant, which backs up the idea that the pattern of adoption of PFP for this occupation differs notably from the pattern shown by the other groups.

{{Place Table 7 about here}}

As far as FPFP is concerned, the results do not differ substantially from the ones that have already been described (see Table 8). All the occupational categories except administrative workers are more likely to be remunerated using FPFP than blue collar employees. According to Model 2, the magnitude of the marginal effects is higher for the top executives' category, which displays a 20 per cent higher probability of receiving this pay scheme than production workers. This result is in line with the one disclosed by the preliminary analysis of the incidence of PFP across occupations. The magnitudes of the results for the rest of occupations support the idea that the use of this system is greater for high-level occupations and diminishes for workers lower on the hierarchical scale. Looking at the tests reported in the fourth column of Table 9, we observe that the top executives' category is the white collar group with a higher probability of receiving FPFP. This result is related to the findings of O'Shaughnessy (1998), who found support for the fact that the effort of CEOs is more directly connected with the performance of the organization and, consequently, it is more likely that they receive FPFP than workers at lower levels in the hierarchy. With just one exception, the tests of the differences between coefficients are always statistically significant, which supports the importance of occupation as a determinant of FPFP adoption.

{{Place Table 8 about here}}

{{Place Table 9about here}}

We now focus on the predictions derived from the strategic pay approach. Looking at the second set of explanatory variables included in Model 1 of Table 5, the analysis reveals that the use of PFP is higher in establishments of medium and large size in comparison with small plants. According to Model 2, only those establishments with 100 to 499 workers have a significantly different probability of using PFP of any kind. In particular, they are around a 9 per cent more likely to adopt PFP than small plants. These findings could indicate that, as the size of the establishment increases, the employer has more resources to develop and manage PFP systems. It is also possible that medium and large plants are more likely to adopt PFP because the costs of implementation can be spread across a higher number of employees. Regression results identify a positive and highly significant effect of the multinational variable, which is consistent with the idea that foreign-owned companies have a tendency to resort to the types of compensation schemes under study. Finally, the HR department variable also correlates positively and significantly with the use of PFP, supporting the hypothesis that the presence of a department dealing with HR promotes the adoption of more sophisticated practices such as PFP. The results obtained for this set of variables show that, besides the importance of agency theory in endeavoring to account for the adoption of PFP, the use of these compensation systems is also led by strategic pay concerns.

The inclusion of the interaction terms (Models 3, 4 and 5) does not substantially change the results displayed in Model 2. However, two interesting outcomes are worth noticing regarding the influence of the top executives occupation. First, Model 2 shows that, when we include the interactions between the size and occupations variables, the former regressor is no longer significant for the excluded occupation category. On the contrary, the findings show that top executives are more likely to receive PFP in plants of a medium size than in small establishments. This result could be related to the fact that, since occupational groups are more numerous as the

number of workers increases, the employer can make a differential use of PFP systems across occupations. Then, we find evidence in favor of the idea that the effect of the establishment size on the use of PFP varies across occupations within the same organization. Second, when we include the interaction terms between foreign ownership and the occupational categories in the analysis, we observe that it is more likely that top executives receive PFP in establishments that are part of a multinational corporation in comparison with domestically-owned companies. This result could be explained by the fact that multinationals have extensive knowledge on HRM issues, so they can make a differential use of PFP across occupations. In our data set, this argument is only observed for the top executives whereas for the rest of groups we do not find a significant influence of the multinational variable on the diffusion of PFP across occupations[5].

It is also worth mentioning that the effects of the exogenous variables do not significantly change whether or not we include the potentially endogenous in the analysis. This result gives additional support to the fact that our exogenous variables have direct effects on the dependent variable.

When we look at the estimations depicted in Model 2 of Table 6, the likelihood of adopting IPFP increases in medium-sized establishments by 4.7 percentage points in comparison with those of a small size, whereas its use in large plants is not statistically different from its adoption in small establishments. Foreign ownership promotes the use of this particular pay scheme, whereas the HR department variable does not emerge as a significant determinant of the

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[5] We have also estimated the probability of using pay for performance of any kind including the three sets of interactions in the same model. The magnitude of the marginal effects, their signs and significance levels are similar to those reported in Table 6. Using this specification, we have tested the joint significance of the three sets of interactions as well as the joint significance of the interactions between size and occupation, multinational and occupation, and HR department and occupation. According to the results, all interactions are jointly significant at the 0.01 level ($\chi^2 = 49.41$). The interactions between size and occupation are also jointly significant at the 0.05 level ($\chi^2 = 21.63$), and the same occurs with the interactions between multinational and occupation ($\chi^2 = 13.43$). The set of interactions between HR department and occupation are not statistically significant.

use of IPFP. When the first set of interactions (Model 3) is included, the interaction effects between the top executive and the size dummies emerge as positive and statistically significant. As we have already mentioned, it is plausible to think that the size of the establishment facilitates a differential use of IPFP across occupations, so that top executives are more likely to be remunerated using this particular scheme. The evidence of the interaction effect of top executives and foreign ownership is also statistically significant at the 0.10 level. Apart from this two results related to the influence of top executives, none of the interactions taken into account in the analysis displays a significant incidence on the dependent variable[6].

Turning to the analysis of the next pay scheme, the use of GPFP increases with the size of the establishment (by 3 and 6.6 percentage points in medium and large plants, respectively, in comparison with small establishments), the membership in a multinational corporation (5.9 per cent) and the existence of a HR department (6.1 per cent). These findings provide further confidence that the adoption of GPFP depends on the strategic needs of the organization. Moreover, only one of the interaction terms emerges as a significant determinant in our estimated equations[7].

Finally, the findings presented in Table 8 for the use of FPFP are consistent with the predictions of the strategic pay approach. Model 2 shows that the probability of using this pay system increases in medium and large size establishments, in contrast to small plants. Being a multinational company also has a positive impact on the adoption of FPFP. Furthermore, the

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[6] We have also estimated an additional model for the use pay for individual performance in which we include the three sets of interactions at a time. The results are not significantly different from those reported in Table 7. For this particular system, all interactions are jointly significant at the 0.05 level ($\chi^2 = 36.65$). The interactions between size and occupation are also jointly significant at the 0.10 level ($\chi^2 = 17.99$), whereas the interactions between multinational and occupation and HR department and occupation do not emerge as statistically significant in this particular specification.

[7] When we estimate the determinants of this model including the three sets of interactions at a time, we find that neither the whole set of interactions nor the interactions between each of the establishment variables and the occupation dummies are statistically significant.

presence of a department dealing with human resources increases the likelihood of adopting FPFP by 9 percentage points[8]. Most of the interaction effects between the occupational dummies and the contingent factors are not statistically significant. The only exceptions are the interaction Sales worker-Large size interaction, and the Professional-Multinational and Middle manager-Multinational pairs.

Overall, we observe that the results of the empirical analysis are in line with both the agency and the strategic pay approaches to the use of PFP. On the contrary, we do not find support for the idea of universality derived from the best practices, economies of scale, bargaining or institutional theories.

Conclusions

In this study, we have analyzed the diffusion of PFP systems across occupational groups of workers using a Spanish sample of manufacturing establishments. More specifically, we have explored three theoretical approaches to PFP: agency theory, which predicts differences in the use of PFP across occupations; strategic pay, which links the design of PFP to contingency factors; and the idea that certain work practices are uniformly applied to the entire workforce within an organization regardless of the occupation and organization features.

In relation to agency theory, the empirical analysis has revealed that occupation is a significant factor in explaining the incidence of PFP schemes, which supports the idea of differentiation in PFP design due to work organization. As far as the comparison among occupations is concerned, we have identified certain patterns of PFP implementation. Sales

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[8] In the specification that includes all the interactions, none of the sets of interaction terms emerge as significant in the analysis of pay for plant or firm performance.

workers constitute the group with a greater coverage of PFP, followed closely by top executives. The use of PFP for the sales workers occupation is mainly concentrated on IPFP, whereas top executives stand out as an important determinant of FPFP. Professional workers and middle managers follow a similar pattern regarding the use of the various schemes of PFP, being remunerated using PFP with a considerable frequency. On the other hand, production and administrative workers are the categories that display a lower incidence of PFP. Finally, and with the exception of administrative workers, those groups that can be classified as white collar (i.e. top executives, professionals, middle managers and sales workers) are, in general, more likely to receive PFP in comparison with blue collar workers. This outcome supports the existence of clusters of occupations, white collar versus blue collar, which receive similar compensation systems (Cardoso 2000).

In addition to the significance of the occupational variables, the findings confirm that the design of PFP plans is also led by strategic pay concerns. This is inferred from the important role played by the size of the establishment, the membership in a multinational company and the existence of a HR department as determinants of PFP use. Overall, the three variables exert a positive and highly significant effect on the use of these kinds of pay plans. On the contrary, the idea of a universal application of HRM practices across occupations does not find support in our empirical analysis.

It is worth mentioning that other interpretations could also contribute to explaining the differences in the use of PFP across occupations. One of these interpretations is the possibility that there are collective agreements operating in the establishment that cover workers in certain occupations (for example, agreements applied to blue collar workers but not white collar employees). To the extent that collective agreements influence the HRM practices adopted by employers, they could lead to differences in PFP between occupations. Another relevant

approach might be occupational licensing. When quality of service is to be enhanced, the employer can resort to contingent pay. However, if these types of contracts are difficult to implement, they might be substituted by licensing (Shapiro 1986). Consequently, occupational licensing provisions could also be a source of inter-occupational variation in the use of PFP.

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Table 1. Size and Sector Distribution of the Establishments in the Sample

Manufacturing Sector	50 to 99 workers	100 to 499 workers	500 or more workers	TOTAL
Food, Beverages and Tobacco	75	70	11	156
Textile Industry, Wearing Apparel, Leather and Footwear	44	24	1	69
Wood and Cork	14	20	0	34
Paper, Editing and Graphic Design	32	31	6	69
Chemical Industry	29	47	4	80
Rubber and Plastic Products	29	34	5	68
Non-metallic Mineral Products	53	50	5	108
Metallurgy and Fabricated Mechanical Products	85	63	6	154
Machinery and Mechanical Equipment	39	34	2	75
Electrical, Electronic and Optical Products and Equipment	31	36	4	71
Transport Equipment	15	37	8	60
Other Manufacturing Industries	38	18	1	57
TOTAL	484	464	53	1001

Table 2. Variable Definition and Descriptive Statistics

Variable	Definition	Mean	Standard Deviation
PFP	1 if any system of PFP is used for 50 percent or more workers; 0 otherwise.	0.421	0.494
IPFP	1 if any system of IPFP is used for 50 percent or more workers; 0 otherwise.	0.260	0.439
GPFP	1 if any system of GPFP is used for 50 percent or more workers; 0 otherwise.	0.123	0.328
FPFP	1 if any system of FPFP is used for 50 percent or more workers; 0 otherwise.	0.159	0.366
50 to 99 employees	1 if the establishment has between 50 and 99 workers; 0 otherwise	0.484	0.500
100 to 499 employees	1 if the establishment has between 100 and 499 workers; 0 otherwise	0.464	0.499
500 employees or more	1 if the establishment has 500 workers or more; 0 otherwise	0.053	0.224
Multinational	1 if the establishment is part of a multinational corporation; 0 otherwise	0.213	0.409
HR Department	1 if there is a department at the establishment or firm that deals with HRM issues; 0 otherwise.	0.712	0.453
Less than 20 years	1 if the establishment has an age of less than 20 years; 0 otherwise	0.264	0.441
20 to 39 years	1 if the establishment has an age between 20 and 39 years; 0 otherwise	0.392	0.488
40 years or more	1 if the establishment has an age of 40 years or more; 0 otherwise	0.344	0.475
Number of competitors	1 if there are no competitors in the product market; 2 if there are few competitors in the product market; 3 if there are quite a few competitors in the product market; 4 if there are many competitors in the product market	3.120	0.770
Technological change	1 if there has not been any significant technological change in the establishment during the last three years; 2 if there has been a minor technological change in the establishment during the last three years; 3 if there has been a important technological change in the establishment during the last three years; 4 if there has been a very significant technological change in the establishment during the last three years; 5 if the production process has totally changed during the last three years	2.624	1.184
Union influence	1 if trade unions have a very low influence over production workers; 2 if trade unions have a low influence over production workers; 3 if trade unions have a medium influence over production workers; 4 if trade unions have a high influence over production workers; 5 if trade unions have a very high influence over production workers	2.910	1.151
Cost	1 if the strategy of the establishment if focused on the cost; 0 otherwise	0.232	0.422
Quality	1 if the strategy of the establishment is focused on the quality; 0 otherwise	0.509	0.500
Flexibility	1 if the strategy of the establishment if focused on the flexibility; 0 otherwise	0.137	0.344
Innovation	1 if the strategy of the establishment is focused on the innovation; 0 otherwise	0.121	0.326
Exports	Percentage of exports over total sales	30.458	29.848
Occupational percentage	Percentage of the occupational group under consideration over total number of employees	16.585	25.052
Occupation	6 occupational categories included		
Industry	12 manufacturing categories included		

Table 3. Percentage of Establishments using PFP for the Different Occupations

	PFP for the majority of workers in the occupation	IPFP for the majority of workers in the occupation	GPFP for the majority of workers in the occupation	FPFP for the majority of workers in the occupation
Top executives	54.9	32.8	15.3	27.2
Professionals	42.4	24.7	13.7	17.7
Middle managers	44.0	25.0	14.5	16.2
Administrative workers	25.0	14.2	6.9	10.2
Sales workers	63.0	49.3	11.4	14.0
Production workers	31.0	18.2	11.5	9.7

Table 4. Percentage of Establishments with PFP for One to Six Occupations

	General	Individual	Group	Plant or Firm
None occupation receives PFP	22.1	35.2	67	66.6
One occupation receives PFP	18.3	23.4	16.7	11.9
Two occupations receive PFP	10.5	11.4	5.6	4.8
Three occupations receive PFP	11.1	8.9	2.9	4.0
Four occupations receive PFP	11.8	7.9	3.7	5.6
Five or six occupations receive PFP	26.2	13.2	4.1	7.1

Table 5. Determinants of PFP Use, Logit Regressions

VARIABLES	MODEL 1	MODEL 2	MODEL 3	MODEL 4	MODEL 5
Constant	-2.682***	-2.682***	-2.583***	-2.700***	-2.817***
	(.475)	(.475)	(.484)	(.482)	(.503)
Top executive	.218***	.305***	.238***	.293***	.289***
	(.020)	(.047)	(.054)	(.050)	(.062)
Professional	.105***	.179***	.162***	.193***	.202***
	(.020)	(.044)	(.051)	(.048)	(.060)
Middle manager	.118***	.196***	.185***	.205***	.241***
	(.019)	(.046)	(.052)	(.050)	(.062)
Administrative	-.072***	-.002	-.006	.002	.066
	(.020)	(.045)	(.052)	(.050)	(.060)
Sales worker	.302***	.384***	.366***	.389***	.430***
	(.023)	(.048)	(.055)	(.051)	(.063)
100 to 499 employees	.108***	.093***	.055	.093***	.093***
	(.023)	(.026)	(.035)	(.026)	(.026)
500 employees or more	.141***	.086	.069	.085	.087
	(.048)	(.053)	(.072)	(.053)	(.053)
Multinational	.184***	.186***	.187***	.187***	.187***
	(.027)	(.029)	(.029)	(.040)	(.029)
HR Department	-	.065**	.065**	.065**	.093**
		(.029)	(.029)	(.029)	(.045)
20 to 40 years	.045	.045	.045	.044	.045
	(.029)	(.030)	(.030)	(.030)	(.030)
40 years or more	.029	..017	.017	017	.017
	(.029)	(.031)	(.031)	(.031)	(.031)
Number of competitors	.009	.020	.020	.020	.021
	(.015)	(.016)	(.016)	(.016)	(.016)
Technological change	-	.007	.007	.007	.007
		(.010)	(.010)	(.010)	(.010)
Union influence	-	-.007	-.007	-.007	-.007
		(.010)	(.010)	(.010)	(.010)
Quality	-	.111***	.111***	.111***	.111***
		(.031)	(.031)	(.031)	(.031)
Flexibility	-	.095**	.095**	.095**	.095**
		(.040)	(.040)	(.040)	(.040)
Innovation	-	.112***	.112***	.112***	.113***
		(.041)	(.041)	(.041)	(.041)
Exports	-	-.000	.000	-.000	.000
		(.000)	(.000)	(.002)	(.000)
Occupational percentage	-	.001*	.001*	.001**	.001**
		(.001)	(.001)	(.001)	(.001)
Industry	Yes	Yes	Yes	Yes	Yes
Top executive x Medium size	-	-	.119***	-	-
			(.044)		
Top executive x Large size	-	-	.194	-	-
			(.120)		
Professional x Medium size	-	-	.022	-	-
			(.042)		
Professional x Large size	-	-	.064	-	-
			(.105)		
Middle manager x Medium size	-	-	.020	-	-
			(.042)		
Middle manager x Large size	-	-	-.034	-	-
			(.090)		
Administrative x Medium size	-	-	.012	-	-
			(.044)		
Administrative x Large size	-	-	-.062	-	-
			(.096)		
Sales worker x Medium size	-	-	.042	-	-
			(.052)		
Sales worker x Large size	-	-	-.142	-	-
			(.127)		
Top executive x Multinational	-	-	-	.096*	-
				(.058)	
Professional x Multinational	-	-	-	-.054	-
				(.050)	
Middle manager x Multinational	-	-	-	-.025	-
				(.050)	
Administrative x Multinational	-	-	-	-.004	-
				(.051)	
Sales worker x Multinational	-	-	-	-.006	-
				(.068)	

Top executive x HR Department	-	-	-	-	.032
					(.051)
Professional x HR Department	-	-	-	-	-.028
					(.050)
Middle manager x HR Department	-	-	-	-	-.058
					(.051)
Administrative x HR Department	-	-	-	-	-.089*
					(.052)
Sales worker x HR Department	-	-	-	-	-.060
					(.056)
Chi-squared	474.96***	448.94***	479.19***	457.36***	473.39***
Pseudo R2	0.0888	0.1040	0.1066	0.1052	0.1053
N	5156	4500	4500	4500	4500

*** p<0.01, ** p<0.05, * p<0.10
Note: Table shows marginal effects (with standard errors clustered at the plant level in brackets)

Table 6. Determinants of IPFP, Logit Regressions

VARIABLES	MODEL 1	MODEL 2	MODEL 3	MODEL 4	MODEL 5
Constant	-2.682***	-2.698***	-2.590***	-2.660***	-2.842***
	(.475)	(.509)	(.525)	(.518)	(.546)
Top executive	.134***	.202***	.142***	.181***	.201 ***
	(.020)	(.046)	(.052)	(.049)	(.059)
Professional	.062***	.117***	.098*	.119**	.131**
	(.020)	(.042)	(.050)	(.047)	(.057)
Middle manager	.065***	.129***	.134**	.123**	.169***
	(.020)	(.045)	(.052)	(.049)	(.060)
Administrative	-.058***	.005	.003	.002	.074
	(.020)	(.043)	(.052)	(.048)	(.058)
Sales worker	.265***	.340***	.320***	.336***	.366***
	(.021)	(.046)	(.053)	(.049)	(.060)
100 to 499 employees	.048**	.047**	.020	.047**	.047**
	(.020)	(.022)	(.034)	(.022)	(.022)
500 employees or more	.014	.003	-.058	.002	.003
	(.042)	(.048)	(.077)	(.048)	(.048)
Multinational	.159***	.175***	.175***	.153***	.176***
	(.022)	(.024)	(.024)	(.037)	(.024)
HR Department	-	.026	.025	.026	.051
		(.025)	(.025)	(.025)	(.041)
20 to 40 years	.047*	.041	.041	.041	.041
	(.025)	(.027)	(.027)	(.027)	(.027)
40 years or more	.056**	.038	.038	.038	.038
	(.025)	(.027)	(.027)	(.027)	(.027)
Number of competitors	.007	.014	.014	.014	.015
	(.013)	(.014)	(.014)	(.014)	(.014)
Technological change	-	-.011	-.011	-0.011	-.011
		(.009)	(.009)	(.009)	(.009)
Union influence	-	-.003	-.003	-.003	-.002
		(.009)	(.009)	(.009)	(.009)
Quality	-	.061**	.061**	.061**	.061**
		(.027)	(.027)	(.027)	(.027)
Flexibility	-	.062*	.061*	.062*	.061*
		(.034)	(.034)	(.034)	(.034)
Innovation	-	.088**	.089**	.088**	.089**
		(.036)	(.036)	(.036)	(.036)
Exports	-	.000	.000	.000	.000
		(.000)	(.000)	(.000)	(.000)
Occupational percentage	-	.001	.001	.001	.001*
		(.001)	(.001)	(.001)	(.001)
Industry	Yes	Yes	Yes	Yes	Yes
Top executive x Medium size	-	-	.095**	-	-
			(.042)		
Top executive x Large size	-	-	.183*	-	-
			(.100)		
Professional x Medium size	-	-	.025	-	-
			(.043)		
Professional x Large size	-	-	.093	-	-
			(.103)		
Middle manager x Medium size	-	-	-.016	-	-
			(.042)		
Middle manager x Large size	-	-	.024	-	-
			(.094)		
Administrative x Medium size	-	-	.002	-	-
			(.045		
Administrative x Large size	-	-	.007	-	-
			(.105)		
Sales worker x Medium size	-	-	.037	-	-
			(.045)		
Sales worker x Large size	-	-	-.026	-	-
			(.094)		
Top executive x Multinational	-	-	-	.082*	-
				(.048)	
Professional x Multinational	-	-	-	-.010	-
				(.047)	
Middle manager x Multinational	-	-	-	.022	-
				(.047)	
Administrative x Multinational	-	-	-	.011	-
				(.047)	

Sales worker x Multinational	-	-	-	.006 (.053)	-
Top executive x HR Department	-	-	-	-	.008 (.045)
Professional x HR Department	-	-	-	-	-.016 (.048)
Middle manager x HR Department	-	-	-	-	-.050 (.047)
Administrative x HR Department	-	-	-	-	-.092* (.050)
Sales worker x HR Department	-	-	-	-	-.031 (.049)
Chi-squared	416.37***	398.31***	432.89***	425.34***	423.70***
Pseudo R2	0.0874	0.1008	0.1034	0.1018	0.1019
N	5132	4481	4481	4481	4481

*** p<0.01, ** p<0.05, * p<0.10
Note: Table shows marginal effects (with standard errors clustered at the plant level in brackets)

Table 7. Determinants of GPFP, Logit Regressions

VARIABLES	MODEL 1	MODEL 2	MODEL 3	MODEL 4	MODEL 5
Constant	-2.682***	-3.799***	-3.837***	-3.888***	-3.944***
	(.475)	(.708)	(.736)	(.724)	(.732)
Top executive	.030**	.070*	.071	.075*	.055
	(.015)	(.036)	(.043)	(.039)	(.048)
Professional	.018	.049	.058	.065*	.074
	(.014)	(.033)	(.041)	(.037)	(.045)
Middle manager	.026*	.060*	.065	.071*	.078*
	(.014)	(.035)	(.042)	(.039)	(.046)
Administrative	-.059***	-.032	-.038	-.028	.001
	(.015)	(.035)	(.043)	(.039)	(.047)
Sales worker	.001	.033	.040	.044	.067
	(.017)	(.037)	(.045)	(.041)	(.051)
100 to 499 employees	.047***	.030*	.029	.030*	.030*
	(.017)	(.018)	(.025)	(.018)	(.018)
500 employees or more	.094***	.066**	.113***	.065**	.066**
	(.029)	(.028)	(.042)	(.029)	(.029)
Multinational	.055***	.059***	.059***	.076***	.059***
	(.028)	(.019)	(.019)	(.026)	(.019)
HR Department	-	.061***	.061***	.061***	.074**
		(.022)	(.022)	(.022)	(.033)
20 to 40 years	.032	.046**	.046*	.046**	.047**
	(.020)	(.022)	(.022)	(.022)	(.022)
40 years or more	.033	.034	.035	.035	.034
	(.021)	(.022)	(.022)	(.022)	(.022)
Number of competitors	.006	.010	.010	.010	.010
	(.010)	(.011)	(.011)	(.011)	(.011)
Technological change	-	.005	.005	.005	.005
		(.007)	(.007)	(.010)	(.007)
Union influence	-	-.010	-.010	-.010	-.010
		(.007)	(.007)	(.007)	(.007)
Quality	-	.036*	.035*	.036*	.036*
		(.021)	(.021)	(.021)	(.023)
Flexibility	-	.072***	.072***	.072***	.072***
		(.026)	(.026)	(.026)	(.026)
Innovation	-	.021	.021	.021	.021
		(.026)	(.026)	(.026)	(.026)
Exports	-	-.000	.-.000	-.000	-.000
		(.000)	(.000)	(.000)	(.000)
Occupational percentage	-	.001	.001	.001	.001
		(.001)	(.001)	(.001)	(.001)
Industry	Yes	Yes	Yes	Yes	Yes
Top executive x Medium size	-	-	.003	-	-
			(.032)		
Top executive x Large size	-	-	-.025	-	-
			(.061)		
Professional x Medium size	-	-	-.007	-	-
			(.031)		
Professional x Large size	-	-	-.073	-	-
			(.062)		
Middle manager x Medium size	-	-	.004	-	-
			(.031)		
Middle manager x Large size	-	-	-.101*	-	-
			(.058)		
Administrative x Medium size	-	-	.020	-	-
			(.037)		
Administrative x Large size	-	-	-.076	-	-
			(.077)		
Sales worker x Medium size	-	-	-.009	-	-
			(.037)		
Sales worker x Large size	-	-	-.029	-	-
			(.073)		
Top executive x Multinational	-	-	-	-.003	-
				(.345)	
Professional x Multinational	-	-	-	-.049	-
				(.034)	
Middle manager x Multinational	-	-	-	-.025	-
				(.033)	
Administrative x Multinational	-	-	-	-.003	-
				(.038)	
Sales worker x Multinational	-	-	-	-.025	-
				(.041)	
Top executive x HR Department	-	-	-	-	.021

					(.038)
Professional x HR Department	-	-	-	-	-.029
					(.036)
Middle manager x HR Department	-	-	-	-	-.020
					(.036)
Administrative x HR Department	-	-	-	-	-.040
					(.039)
Sales worker x HR Department	-	-	-	-	-.040
					(.043)
Chi-squared	141.21***	193.90***	209.87***	197.34***	145.96***
Pseudo R2	0.0517	0.0770	0.0785	0.0778	0.0781
N	5097	4450	4450	4450	4450

*** p<0.01, ** p<0.05, * p<0.10

Note: Table shows marginal effects (with standard errors clustered at the plant level in brackets)

Table 8. Determinants of FPFP, Logit Regressions

VARIABLES	MODEL 1	MODEL 2	MODEL 3	MODEL 4	MODEL 5
Constant	-2.682***	-4.707***	-4.725***	-4.897***	-4.667***
	(.475)	(.742	(.759)	(.766)	(.789)
Top executive	.162***	.208***	.203***	.225***	.200***
	(.0017)	(.038)	(.044)	(.043)	(.053)
Professional	.088***	.128***	.132***	.153***	.116**
	(.017)	(.034)	(.042)	(.040)	(.055)
Middle manager	.071***	.111***	.114***	.143***	.127**
	(.017)	(.037)	(.044)	(.042)	(.055)
Administrative	.007	.045	.043	.067	.025
	(.016)	(.035)	(.044)	(.042)	(.059)
Sales worker	.053***	.092**	.113**	.118***	.091
	(.020)	(.038)	(.046)	(.045)	(.059)
100 to 499 employees	.073***	.045**	.051	.044**	.044**
	(.019)	(.021)	(.031)	(.021)	(.021)
500 employees or more	.113***	.073*	.045	.073*	.073*
	(.035)	(.038)	(.061)	(.038)	(.038)
Multinational	.112***	.101***	.102***	.143***	.101***
	(.021)	(.021)	(.021)	(.032)	(.021)
HR Department	-	.090***	.089***	.089***	.086**
		(.026)	(.026)	(.026)	(.041)
20 to 40 years	.005	.003	.003	.003	.003
	(.023)	(.024)	(.024)	(.024)	(.024)
40 years or more	-.027	-.031	-.031	-.030	-.031
	(.024)	(.026)	(.026)	(.026)	(.026)
Number of competitors	.002	.008	.008	.008	.008
	(.012)	(.013)	(.013)	(.013)	(.013)
Technological change	-	.011	.011	.011	.011
		(.008)	(.008)	(.008)	(.008)
Union influence	-	.003	.003	.003	0.003
		(.008)	(.008)	(.008)	(.008)
Quality	-	.066**	.066**	.066**	.066**
		(.025)	(.025)	(.026)	(.026)
Flexibility	-	.081***	.081***	.081***	.081***
		(.030)	(.030)	(.030)	(.030)
Innovation	-	.053	.054	.052	.053
		(.033)	(.033)	(.033)	(.033)
Exports	-	.000	.000	.000	.000
		(.003)	(.000)	(.000)	(.000)
Occupational percentage	-	.001	.001	.001	.001
		(.001)	(.001)	(.005)	(.001)
Industry	Yes	Yes	Yes	Yes	Yes
Top executive x Medium size	-	-	.002	-	-
			(.035)		
Top executive x Large size	-	-	.070	-	-
			(.074)		
Professional x Medium size	-	-	-.014	-	-
			(.035)		
Professional x Large size	-	-	.057	-	-
			(.071)		
Middle manager x Medium size	-	-	-.007	-	-
			(.035)		
Middle manager x Large size	-	-	.026	-	-
			(.069)		
Administrative x Medium size	-	-	-.001	-	-
			(.036)		
Administrative x Large size	-	-	.042	-	-
			(.067)		
Sales worker x Medium size	-	-	-.023	-	-
			(.041)		
Sales worker x Large size	-	-	-.206*	-	-
			(.114)		
Top executive x Multinational	-	-	-	-.026	-
				(.034)	
Professional x Multinational	-	-	-	-.055*	-
				(.033)	
Middle manager x Multinational	-	-	-	-.074**	-
				(.034)	
Administrative x Multinational	-	-	-	-.042	-
				(.034)	
Sales worker x Multinational	-	-	-	-.054	-
				(.042)	
Top executive x HR Department	-	-	-	-	.008

					(.043)
Professional x HR Department	-	-	-	-	.013
					(.046)
Middle manager x HR Department	-	-	-	-	-.022
					(.046)
Administrative x HR Department	-	-	-	-	.023
					(.051)
Sales worker x HR Department	-	-	-	-	-.000
					(.053)
Chi-squared	265.31***	256.63***	275.62***	268.94***	276.52***
Pseudo R2	0.0842	0.1066	0.1086	0.1077	0.1069
N	5135	4484	4484	4484	4484

*** p<0.01, ** p<0.05, * p<0.10

Note: Note: Table shows marginal effects (with standard errors clustered at the plant level in brackets)

Table 9. Wald Tests: Chi-Squared Values

	ANY	INDIVIDUAL	GROUP	PLANT OR FIRM
Sales worker - Top executive	16.30***	66.68***	6.42**[a]	57.44*** [a]
Sales worker – Professional	103.82***	157.48***	1.05 [a]	6.69* [a]
Sales worker – Administrative	284.92***	275.10***	15.71***	9.02**
Sales worker – Middle manager	86.65***	137.15***	3.39* [a]	1.65 [a]
Top executive – Professional	73.99***	38.85***	3.82*	61.53***
Top executive – Administrative	266.62***	124.32***	48.60***	144.58***
Top executive – Middle manager	47.29***	25.11***	0.77	74.56***
Middle manager - Professional	1.60	0.91	1.61 [a]	3.02* [a]
Middle manager - Administrative	147.55***	61.62***	59.28***	33.42***
Professional - Administrative	142.25***	58.50***	45.61***	54.66***

*** p<0.01, ** p<0.05, * p<0.10

Note: Table 9 displays the results of the tests of coefficient equality obtained in the first model of tables 5 to 8. In each cell, we test the null hypothesis that the coefficient of the first occupation equals the coefficient of the second occupation versus the alternative hypothesis that the coefficient of the first occupation is higher than the coefficient of the second occupation. In the cells with a superscript, we test the null hypothesis versus the alternative hypothesis that the coefficient of the second occupation is higher than the coefficient of the first occupation.