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ABSTRACT

Performance Appraisal: Dimensions and Determinants*

The determinants of the dimensions that shape a formal system of performance appraisal are studied in relation to a sample of Spanish manufacturing establishments. In particular, the factors that influence the measures used to evaluate performance, the person who carries out such appraisal and its frequency are analysed. Our results show that the characteristics of the establishment exert a significant influence on the configuration of performance appraisal. Specifically, we find that the use of practices complementary to performance evaluation and the structural factors of the establishment are found to correlate closely with the dimensions of formal performance appraisal.

JEL Classification: M12, M5

Keywords: performance appraisal, monitoring, establishment characteristics, dimensions of appraisal

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INTRODUCTION

Formal performance appraisal is a human resource management (HRM) practice that has attracted considerable attention from both practitioners and scholars (see Fletcher, 2001). The interest in the implementation of formal performance appraisal systems stems from the fact that such practice may accomplish a wide variety of functions. These functions may include the monitoring of employees, the communication of organisational values and objectives to workers, the evaluation of hiring and training strategies, and the validation of other HRM practices (see Baron and Kreps, 1999). In addition, the design of a performance appraisal system is complex due to the multiple dimensions involved and because of the various interests in evaluation outcomes among different agents. As a result, research on the issue is extensive and has focused on a broad range of aspects (see Levy and Williams, 2004).

One of the topics that has drawn the attention of researchers in the performance evaluation field is the influence of organisational context on the implementation of a formal system of performance appraisal (see Murphy and Cleveland, 1991). In particular, recent studies have examined the relationship between establishment features and the adoption of formal performance appraisal (see Brown and Heywood, 2005; Addison and Belfield, 2008; and Grund and Sliwka, 2009). However, empirical work on this issue is still scarce, and much remains to be learned about how the decision to implement formal performance appraisal is taken by the employer. The aim here is to complement this empirical research and examine the influence that organisational features exert on the use of a formal system of performance appraisal, focusing on the different dimensions that characterise such a system.

In the main, existing studies on the implementation of formal performance appraisal have concentrated on the analysis of the determinants of the employer's decision to adopt a formal system of appraisal. Since formal performance evaluation is a multidimensional process and, consequently, its design may differ significantly among employers, we go a step further in the study of the practice at establishment level and analyse the factors that determine how a system of performance evaluation is implemented from a comprehensive perspective. According to Brown and Heywood (2005),

performance appraisal is adopted when the employer expects to obtain benefits from the use of the practice. The idea here is that the employer has to decide not only if it is worth adopting a formal system of performance appraisal, but also how this system will be shaped in order to obtain returns. As Baron and Kreps (1999) point out, the appropriateness of a system of performance appraisal depends on the characteristics of the organisation and the HRM system adopted by the employer. With these concerns in mind, and taking into account the determinants of the adoption of performance appraisal, we believe that the establishment-level variables that influence the configuration of the appraisal process need to be more investigated in greater depth. Brown and Heywood (2005) recognise the significance of these issues and acknowledge that "... (our) data do not provide information on the intensity of the appraisal process, what instruments are used or how the gathered information influences management behaviour towards workers. All of these are important dimensions of performance appraisal but they are simply not measured in our data".

Our study is based on a Spanish data set relating to HRM practices, which is based on a survey carried out with a representative sample of Spanish manufacturing establishments. A major advantage of using this data set is that it contains very detailed information on the dimensions that characterise a formal system of performance appraisal at establishment level. The information provided enables analysis of various features of such appraisal that, thus far and to our knowledge, have not been studied using establishment-level data. Our empirical strategy starts with an examination of the influence of a set of factors on the adoption of a formal system of performance appraisal in Spanish establishments. This analysis draws on the work of Brown and Heywood (2005), and four groups of variables are included as explanatory factors in our regression equation: workforce characteristics, level of job control, complementary HRM practices and structural factors. As mentioned above, our main objective is to analyse the determinants of various dimensions of the performance appraisal process. Since formal performance appraisal is defined in accordance with a number of aspects, we think that it is relevant to investigate the influence of the four groups of explanatory factors on the configuration of the practice, not only on the decision to adopt it. First, we study the determinants of the measures used to evaluate performance are addressed. Second, the

establishment attributes that determine the person who carries out the evaluation are analysed. Finally, the influence of our set of explanatory variables on the frequency of the process is estimated.

The paper is organised as follows. In the following section, a brief description of the dimensions of a performance appraisal system accounted for in this study is given. Then, an overview of the theoretical insights regarding the factors that may influence the use of performance appraisal as well as its different dimensions is provided. The next section describes the methodology used in our empirical analysis. Finally, the findings of the study are described and discussed, and our main conclusions presented.

DIMENSIONS OF A FORMAL SYSTEM OF PERFORMANCE APPRAISAL

Since our aim is to examine how establishment features influence the configuration of a formal system of performance appraisal, the main aspects of such a system are first described. In particular, we focus on three dimensions that should be taken into account when analysing performance appraisal at the establishment level: the type of measures used to rate performance, the person who carries out the appraisal, and the frequency with which the appraisal is conducted.

Measures of Performance

The performance of a worker can be evaluated using different criteria (see Wall et al., 2004). On the one hand, performance may be determined according to objective measures such as the number of pieces produced, the value of sales or the quality of output. These measures are directly observed both by the person who performs the evaluation and the person being evaluated (see Prendergast, 1999). As a consequence, the use of objective measures might simplify appraisal through a standardisation of processes. Moreover, it could generate perceptions of equity since the parameters that are evaluated are fixed and well-known to employees. However, it is not always possible to rate worker performance according to an objective measure. Jobs often consist of the performance of a

variety of tasks, and it may be difficult for an employer to evaluate performance using a single objective measure. Moreover, when a worker performs different tasks and is assessed using a particular objective criteria such as the number of units of output, (s)he may be tempted to concentrate on the activity that is most directly linked to the performance measure used. In the words of Baron and Kreps (1999), this may give rise to a problem of “misalignment of incentives”.

On the other hand, evaluation may be determined according to subjective performance measures, based on the evaluator’s judgements (see Baker, 1994). The use of subjective measures provides flexibility in the appraisal system, since it is possible to adapt the evaluation process to the particular circumstances of a job. In addition, it makes it possible to account for the different dimensions of a worker’s job, avoiding the potential problem of “misalignment of incentives” (see Prendergast, 1999). However, it may enhance perceptions of inequity among workers since ratings are not based on observable and clearly-defined criteria, and it could also give rise to distortions and inefficient behaviour. Subjective criteria may be used instead of objective measures, but both types of measures are commonly implemented in conjunction with one another and act as complementary determinants of performance. In light of these concerns, the particular features of the establishment may be expected to affect the type of criteria used in formal performance appraisal.

Who Evaluates Performance

When designing a system of appraisal, the issue of who will perform the evaluation is a key concern. This person is frequently an employee’s immediate superior (see Murphy and Cleveland, 1995), but a manager at a higher level may carry out this task as well. In organisations with a formal HRM framework, evaluation could be carried out by a person from the human resource management department (HRM department). In some contexts, subordinates, peers or even customers provide useful information on certain aspects of worker performance: subordinates are in a good position to observe leadership abilities; peers may be able to evaluate interpersonal relationships; and customers can assess the quality of service. Since appraisal is often aimed at rating various attributes of a

worker's performance, evaluation from different sources is commonly required (see Bohlander and Snell, 2009). The immediate superior is the figure that most commonly monitors workers, but a better qualified supervisor may perform the appraisal when the evaluation process is complex or when specific appraisal needs emerge (see Murphy and Cleveland, 1995). For several reasons, the choice of the person carrying out the appraisal is crucial for organisational success. For example, supervisors need to be able to communicate the results of the appraisal to workers effectively, especially if the purpose of appraisal is to provide feedback to employees. In addition, the use of a formal system of performance appraisal is costly for the organisation, so identifying the adequate supervisor is important if the organisation wants to obtain returns from its investment in the implementation of the process. All in all, the quality and effectiveness of a system of appraisal depends largely on the skill of the person performing the assessment, so the choice of an appropriate supervisor should be a major concern for organisations implementing a formal system of evaluation (see Nurse, 2005).

Frequency of Appraisal

Another significant feature of performance appraisal is the frequency of assessment. The timing of appraisal should be carefully taken into consideration, since frequency could affect the results of the process. For example, Werner and Bolino (1997) state that a high rating frequency increases evaluation accuracy as well as its perceived fairness and worker satisfaction. The aim pursued of the performance assessment process may influence its timing (see Murphy and Cleveland, 1995). Hence, in many organisations performance appraisal is carried out annually, since the administrative decisions based on the appraisal results are taken yearly. This is the case of pay increases or employment promotions. In contrast, evaluations whose objective is to provide employees with feedback will be performed more often. There are also organisations in which the frequency of performance evaluation does not follow a fixed pattern. Moreover, the time-frame of performance evaluation depends on the tasks carried out by a worker and the nature of the job, since the type of work determines if the results are observed in the short, medium or long-term (see Baron and Kreps, 1999).

FACTORS THAT INFLUENCE THE CONFIGURATION OF PERFORMANCE APPRAISAL

Following Brown and Heywood (2005) and Addison and Belfield (2008), a number of variables that may contribute to explaining the configuration of performance appraisal systems are identified. These variables can be classified into four categories: workforce characteristics, level of job control, related human resource management practices and structural features of the establishment. In what follows, the variables included in each of these four groups are listed, as well as their expected influence on the adoption of a system of performance evaluation and the dimensions of the practice.

Workforce Characteristics

Brown and Heywood (2005) state that the expected tenure of the workforce may influence the probability of adopting a formal system of performance appraisal. In particular, the authors argue that the proportion of casual workers, women and long-tenured employees, as well as the turnover rate of the establishment, are related to the use of a formal system of evaluation. According to these authors, if performance appraisal is used as a tool for monitoring worker effort and set compensation, establishments with short-tenured employees are more likely to implement a formal system of performance evaluation. Moreover, establishments with short-tenured employees are more likely to use appraisal in order to assign workers to jobs and take dismissal or retention decisions. By contrast, Brown and Heywood (2005) point out that if the purpose of appraisal is to promote worker identification with organisational objectives and develop human capital, a long-tenured workforce will have a positive influence on the adoption of performance appraisal.

Following the arguments presented by Brown and Heywood (2005), we expect that workforce characteristics to be related to the measures used to evaluate performance. As stated in the previous paragraph, those establishments with a high proportion of short-tenured workers use performance

appraisal to monitor employee output and reward them accordingly. Milkovich and Widgor (1991) mention that a system of appraisal that pursues this goal is characterised by an “emphasis on standardisation, objective measurement, psychometric properties (validity, reliability, bias, etc.)”. Moreover, short-tenured workers are frequently assigned to simple jobs for which it is easier to implement routine monitoring processes based on objective criteria. Hence, we hypothesise that, in establishments with a large proportion of short-tenured workers, it is more likely that performance appraisal will be based on objective criteria. This expected correlation is supported by an additional argument in the case of women. Women are believed to sort into establishments that adopt employment practices which leave less scope for discrimination. Using German data, Jirjahn and Stephan (2004) find support for the hypothesis that women prefer piece-rate remuneration schemes because the use of objective measures of performance avoids wage discrimination.

However, there are other arguments that could help to explain the relationship between the proportion of casual and female employees in the measures used to evaluate performance. In Spain, employees frequently work on temporary contracts before they get permanent jobs. In other words, temporary work is used by employers as a probationary period before offering workers a permanent position within the organisation. During this probationary period, the employee will be appraised comprehensively in order to decide if (s)he is to be retained. If the employer wants to evaluate various dimensions of a worker’s performance in order to take this decision, it may not be useful to employ an objective measure. An alternative idea that could help to support these arguments is the following. Workers tend to favour the use of objective measures of performance because they are easily verifiable and, consequently, are regarded as more equitable. Both casual and female workers are frequently subject to discrimination, poorer employment conditions and lower employment protection in comparison with other employees. As a result, it may be that, in contrast to workers with a higher influence over management decisions, they cannot insist on appraisal using objective criteria and are more frequently subject to subjective assessment.

The person who evaluates performance may also be influenced by the average tenure of the workforce at the establishment. As we have pointed out, the immediate superior is the figure that most frequently rates worker performance, whereas other supervisors with more specific abilities are in

charge of the appraisal when the evaluation is complex or when there are specific appraisal needs. Hence, for workers with a long-expected tenure, performance appraisal is intended to provide feedback, communicate organisational objectives and develop human capital, so the process of appraisal needs to be more detailed and complex. Thus, we argue that, in establishments with a high proportion of short-tenured workers, supervision will be carried out by an immediate superior. However, when the proportion of long-tenured employees is high, it is more likely that such appraisal will be carried out by a person at a higher level who is able to identify worker strengths and weaknesses and communicate effectively with employees.

The tenure of the workforce could have a bearing on the timing of the evaluation process. Hence, employees at an early stage in their careers will be subject to more frequent evaluations in order to assess if they fit a specific job position, to identify abilities and training needs, or to take promotion decisions (see Lazear, 1998). In contrast, as a worker's career develops, evaluations become less frequent and usually stabilise. Hence, the percentage of short-tenured workers in an establishment may be positively related to the frequency of evaluation. On the other hand, a negative correlation is expected between the proportion of workers with high tenure and the periodicity of performance appraisal.

Job Control

As Brown and Heywood (2005) point out, an establishment is more likely to implement a system of performance evaluation when workers have control over their work and, consequently, when they can alter their performance according to the results the appraisal yields. Moreover, in order to take full advantage of a system of performance evaluation, an establishment requires a considerable amount of supervisory force. It may also be the case that performance appraisal is implemented jointly with other forms of monitoring so that a high number of supervisors is needed (see Brown and Heywood, 2005). Building on these arguments, we predict that job autonomy and the number of

supervisors per employee will be positively related to the implementation of a formal system of performance appraisal.

Regarding performance measurement, Brown and Heywood (2005) point out that “formal appraisal will yield benefits when each worker has substantial scope in determining their tasks and effort levels and the results of these choices are not immediately obvious”. Under these circumstances, it may be difficult to measure worker performance using a standardised objective measure, since it prevents the adaptation of the evaluation to different circumstances and fails to account for the different dimensions of a worker’s job. Consequently, we predict that the degree of autonomy that employees have in their work will be negatively related to the use of formal appraisal based solely on objective criteria. In addition, subjective criteria are applied when a job is complex or when the identification and measurement of output are difficult. Hence, the use of subjective appraisal cannot be based on the implementation of a standardised process; rather, it relies on the judgements of the supervisors in charge of the practice. As a result, we hypothesise that the number of supervisors in the workplace will be positively associated with the use of performance appraisal based on subjective measures of performance or on a combination of subjective and objective measures.

When workers have substantive autonomy in their work, the appraisal process is more complex and it may be difficult for an immediate superior to evaluate performance. According to Murphy and Cleveland (1995), the immediate superior is well-suited to rate general performance, whereas a supervisor at a higher level is able to determine the particular dimensions of performance that are most important to the organisation and the behaviours required to improve worker performance. Hence, it is plausible to think that when worker autonomy is high, performance appraisal will be carried out by professionals at a high level in the organisation or by a person from the HRM department who is formally trained in HRM. Finally, the presence of a high number of supervisors may indicate that worker supervision is valuable to the organisation, so that formal performance appraisal is part of a more general system of monitoring. If monitoring is considered to be beneficial for the establishment, a higher frequency of performance appraisal may be anticipated. In other words, it may be the case that in establishments that devote extensive resources to supervision (such as a large number of supervisors), performance appraisal is carried out with a higher frequency.

HRM Practices

Certain HRM practices are implemented in conjunction with performance appraisal due to the existence of complementarities and a joint impact on the organisation's performance (see Huselid, 1995; Becker and Gerhart, 1996; Ichniowski et al., 1997). One such practice is the provision of training. According to Brown and Heywood (2005), monitoring worker performance may be desirable when training is provided, since employers could use performance appraisal as an instrument to determine training needs and evaluate training results. Another complementary practice considered in the literature is pay based on individual performance. One of the main purposes of an appraisal system is to measure worker performance, which in turn is essential to establishing an incentive system based on individual output. Consequently, the provision of training and pay for individual performance may be expected to exert a positive influence on the probability of adopting a formal performance appraisal system.

We acknowledge that complementary HRM practices may have an impact on the measures used to evaluate performance. According to Brown and Heywood (2005), pay for individual performance may be used as an incentive system for workers who are not motivated by deferred payments. Since performance appraisal might also accomplish this objective, both practices could be jointly implemented as part of a system aimed at motivating employees (see Drago and Heywood, 1995; Heywood et al., 1997; and Shields, 2002). We have already noted that a system of appraisal whose objectives are to monitor performance and reward workers is characterised by a standardisation of processes and the use of objective measures. Hence, we expect to observe a positive correlation between the use of individual pay for performance and the adoption of formal performance appraisal based on objective criteria. Second, formal performance appraisal may serve as an instrument to determine training needs, evaluate training results, provide feedback to workers and guide their development according to the results of evaluation. In other words, if training is provided, formal performance appraisal could be used for a developmental purpose (see Boswell and Boudreau, 2002).

When formal evaluation has a developmental goal, the supervisor needs to assess worker performance in a comprehensive way, paying attention to various aspects of the job. This exhaustive evaluation might be more difficult if an objective measure of performance is used. On the contrary, when appraisal is used to provide feedback to workers, it may be valuable to measure performance using objective criteria so that workers can understand the results of evaluation and use them to improve future performance. In light of these arguments, no precise effect of the provision of training on the measures used to evaluate performance can be predicted. Therefore, the empirical analysis carried out here may enable significant clarification of the correlation between this complementary practice and performance measurement.

Regarding the person that conducts the evaluation, we have pointed out that establishments may adopt both formal performance appraisal and individual pay for performance as part of a monitoring and compensation scheme. An appraisal system that pursues this objective is expected to be less complex than developmental performance appraisal, so it may be carried out by the workers' immediate superior. Consequently, we anticipate that the use of pay for individual performance will be positively related to the probability that an immediate superior performs the evaluation. Finally, we also expect to find a correlation between the provision of individual incentives and frequency of appraisal. Pay for individual performance is an administrative decision that requires an evaluation process. Evaluations whose objective is to take administrative decisions will be less frequent than those aimed at developing human capital (see Murphy and Cleveland, 1995). Consequently, a negative correlation may be expected between the provision of pay for individual performance to workers and the frequency of performance appraisal.

Structural Factors

Brown and Heywood (2005) point to the existence of a correlation between some structural factors and the use of performance appraisal. First, they predict a positive influence of establishment size due to both economies of scale and the difficulty of monitoring workers' effort in large

organisations. Second, labour costs have also been identified as a potential positive influence in the use of a formal system of evaluation. The abovementioned authors also argue that this is due to the fact that “the scale economies are more likely to be overcome when labour cost is important for firms of the same size”. In addition, they state that the presence of human resource professionals may favour the use of performance appraisal, since it is related to the adoption of more sophisticated employment practices. Finally, they make reference to union influence as a circumstance that may cause difficulties when trying to implement a system of appraisal. Following these arguments, positive effects of establishment size, the proportion of labour costs in total production costs and the presence of a HRM department are to be expected in relation to the use of performance appraisal, and a negative effect of the influence exerted by trade unions at the establishment.

Regarding performance measures, several possible relationships with the structural factors may be predicted. First, as the size of the establishment increases, monitoring difficulties emerge because it is more complicated to observe the performance of workers directly (see Grund and Sliwka, 2009). This leads us to believe that employers in large establishments may choose to overcome the monitoring difficulties through the implementation of a formal and more standardised system of appraisal based on objective criteria. Moreover, Grund and Sliwka (2009) point out that large firms need to compare worker performance in order to take promotion decisions, so the adoption of a standard system of appraisal becomes useful. On the other hand, large establishments may devote a higher amount of resources to the appraisal process. In addition, it is more likely that they have a higher number of supervisors and, more generally, a higher number of professionals qualified to carry out a formal process of appraisal. Although subjective monitoring is less straightforward than objective supervision and requires the use of a higher amount of resources, large establishments may find it easier to implement a system of appraisal based on subjective measures. Hence, no precise relationship between firm size and the measures of performance appraisal is anticipated. Second, unions tend to oppose the use of practices that discriminate against workers. As far as performance appraisal is concerned, unions may be expected to promote evaluations that are carried out with fairness and objectivity. Moreover, unions tend to promote a standardisation of human resource

practices in order to avoid differences among workers. Consequently, we predict a positive relationship between union influence and the use of performance appraisal based on objective criteria.

As noted earlier, managers and workers in small firms work closely together, so performance may be easily determined. However, when the size of the establishment increases, the degree of hierarchy also rises (see Drago and Heywood, 1995). As a result, the distance between workers and decision-makers is extended, and it becomes more difficult for decision-makers to monitor worker performance (see Brown and Heywood, 2005). In order to reduce the monitoring difficulties caused by such extensive chains of command, large establishments may rely on the immediate supervisor as a figure that closely observes worker performance. As a result, a positive influence of the size variable on the probability that the appraisal is conducted by an immediate superior may be expected.

As far as the frequency of appraisal is concerned, our hypothesis is that the size of the establishment and the proportion of labour costs will contribute to overcoming the fixed costs of implementing performance appraisal. Consequently, we think that the frequency of appraisal rises in relation to establishment size and as the proportion of labour costs in total production costs increases. On the other hand, the existence of a HRM department within the establishment means that human resources are assumed to be key to business success. If human resources constitute an important asset for the organisation, it is expected that the process of appraisal will be exhaustive and, therefore, time-consuming. In addition, we have already pointed out that the presence of a HRM department is associated with the adoption of complex practices. If the system of appraisal adopted by an organisation is very sophisticated, it will take considerable time to collect information about worker performance and the periodicity of evaluation will be low. These concerns prompt the hypothesis that the existence of a HRM department will be negatively related to the frequency of performance appraisal.

METHODOLOGY

Data and Variable Description

The data was gathered through personal interviews with managers in Spanish manufacturing plants with fifty or more employees, and represents a unique source of information regarding a range of HRM practices in Spanish firms. Information was collected at plant level, as this is the unit at which decisions related to the implementation of the relevant practices 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 database was as follows. Once the objectives and scope of our study were defined, and in order to properly design the questionnaire, we carried out a thorough examination of the literature related to the purpose of the project. In light of 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 the final version.

Most of the information on HRM refers exclusively to blue-collar workers, that is, workers involved directly in the production process. The reason for restricting the analysis to this category of employees is due to the existence of a range of different internal labour markets with different features within the same organisation. Limiting the study to manual workers makes comparisons across establishments easier.

The data was obtained in 2006 through personal interviews with one of the managers at the plant. We considered that questions should be addressed either to the general manager or the human resource manager. In practice, the most frequently interviewed figure was the human resource manager. The interviews with managers who agreed to answer our questionnaire were performed by professionals with specialized training 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. The final sample comprises 1,001 establishments, which matches expectations regarding the size of the data set and yields a response rate of 34.1 per cent.

The data set contains information on various dimensions of the process of performance appraisal, which enables an in-depth analysis of the practice. Hence, questionnaire respondents were asked about the presence and coverage of a formal system of performance evaluation for production workers. In addition, the questionnaire addresses whether evaluation is based on objective or subjective measures of performance. The survey also includes questions that refer to the person carrying out the appraisal: a worker's immediate superior, another line manager or a person from the HRM department. Finally, information on the frequency of the evaluation is provided. Hence, respondents were asked if appraisal is carried out biennially, annually, biannually or with a higher periodicity.

As already detailed above, four groups of explanatory variables are included in the analysis. The category of workforce characteristics contains the percentage of casual workers, females and employees over 50 years old, as well as the number of workers that stopped working in the establishment in the last year. Two variables related to job control are taken into account: a measure of the degree of autonomy of workers over their work and the number of supervisors per employee. Two variables that represent HRM practices complementary to the use of formal performance appraisal are also considered. These practices are the provision of off-the-job training to workers and the adoption of pay linked to individual performance. Four variables representing structural factors are included in the regressions: the number of employees in the establishment, the percentage of labour costs in total production costs, the presence of a HRM department, and the influence of unions over workers. Finally, 12 manufacturing categories are included as controls in the analysis. With the exception of the general characteristics of the establishment (i.e. the number of employees, the labour costs, the presence of a HRM department and the industrial sector), the rest of variables refer to production workers. The sample means, standard deviations and definitions of the variables concerning the process of appraisal, as well as the explanatory variables, are presented in Table 1. Given missing values for some of the variables, the final sample of establishments used in the estimations comprises 645 observations.

Estimation Procedure

Our empirical analysis involved studying the determinants of the dimensions of a formal system of performance appraisal for production workers. The first step is to estimate the determinants of the use of performance appraisal at firms in which at least 50 per cent of production workers are covered by the practice. This model will also be used as a selection equation in the regressions concerning the different dimensions of appraisal. Second, the factors that influence the measures used to evaluate performance are examined. At this point, a potential sample selection bias, known as incidental truncation, emerges (see Heckman, 1979). The incidental truncation is due to the fact that only data on the dependent variable (i.e. the measures of performance) for establishments in which a formal evaluation system exists is available (see Wooldridge, 2003). Consequently, this is taken into account in the estimation of the equations of interest using the sample selection equation mentioned above.

In addition, the determinants of the person who evaluates performance are estimated. The evaluation may be carried out by a worker's immediate superior, another line manager or a person from the HRM department. Therefore, three sample selection models are estimated following the aforementioned process. Finally, the influence of our set of explanatory variables on the frequency of the performance appraisal is studied. Again, only establishments which have adopted a formal system of evaluation provide information on the frequency of appraisal. Consequently, this potential selection bias is taken into account and a sample selection model using our first model as the selection equation is estimated.

With the exception of the industry sector, it should be noted that the same explanatory variables are included in all the models estimated. Since it is the factor used as the selection variable, the industry sector appears in the estimation of the probability that an establishment uses a formal system of performance appraisal (the selection equation in the sample selection models) but not in the other equations. This specification satisfies the "exclusion restriction" and avoids a potential problem

of multicollinearity (see Wooldridge, 2003). The reason for using the industry sector as the selection variable rests on our belief that the production process may influence the employer's decision to adopt a formal system of appraisal. Certain aspects relating to the industry sector, such as technological requirements, may favour or compromise the adoption of a performance appraisal system. Hence, in some industries, individual performance is more easily identified and measured, which in turn affects the possibility of using formal performance appraisal and obtaining the benefits that may be obtained from the practice. However, no argument for an incidence of the industry on the dimensions that characterise such a system has been discerned.

RESULTS AND DISCUSSION

The results of the estimated models regarding the use of a formal system of performance appraisal as well as the different dimensions of the process are presented in Tables 2 to 5.

As far as the probability of using a formal system of performance appraisal is concerned, none of the variables representing workforce characteristics emerge as significant in the analysis (see Table 2). These results indicate that workforce tenure has no bearing on the adoption of a formal performance appraisal system in Spanish manufacturing establishments. Concerning the variables related to job control, these are not significantly correlated with the adoption of a formal system of performance appraisal. These results match the findings of Addison and Belfield (2008) for Great Britain. As a possible explanation, these authors suggest that workers have substantial autonomy in their work, whereby they can take better decisions than their supervisors or managers, so the organisation need not evaluate them using a formal system of performance appraisal. With regard to the use of complementary practices, the estimations confirm the idea that the provision of pay for individual performance exerts a positive influence on the probability of using performance appraisal. In addition, we observe that in establishments where production workers receive off-the-job training, the use of a formal appraisal procedure is more likely. As stated in the theoretical framework section, this correlation may indicate that establishments use performance appraisal as an instrument to take and evaluate training decisions. Finally, the analysis of the structural factors shows that the size of the

establishment is positively related to the use of performance appraisal, but the rest of explanatory variables representing structural factors do not seem to influence the adoption of such a system.

Table 3 displays the results of the multinomial probit regressions for the performance measures, taking the use of both objective and subjective criteria as the reference category. A positive relationship may be traced between the proportion of casual workers and the use of objective criteria in performance measurement. As stated in the theoretical section, this finding may be due to the fact that, for casual workers, performance appraisal is used as a monitoring tool characterised by a standardisation of the process and the use of objective measures (see Milkovich and Widgor, 1991). Our results show that the proportion of females exerts a significant and positive effect on the use of appraisal based on subjective measures. If women are subject to discrimination at work, poorer working conditions and lower participation in decisions concerning their appraisal in comparison to other groups of workers, it is possible that they are rarely evaluated using objective criteria. Regarding the job control variables, the results support our idea that the degree of autonomy of workers compromises performance evaluation based solely on objective measures. The number of supervisors per worker is also negatively related to the adoption of performance appraisal based on objective criteria. This result seems to indicate that when the establishment devote a large amount of resources to supervision, it is less likely that appraisal is based only on objective criteria. Finally, neither the complementary practices nor the structural factors that characterise the establishment are significantly correlated with the measures used to evaluate performance.

The results concerning the person who carries out performance appraisal are presented in Table 4. First, the percentage of workers over 50 years old correlates positively with the probability that the appraisal is carried out by a manager other than the immediate superior. If we assume that this variable is a proxy for the proportion of workers with a high attachment to the organisation (so that they do not need to be directly monitored by an immediate superior) and who have developed firm-specific human capital (so that specific evaluation by a HRM specialist is not required), it is plausible to conclude that a line manager is well suited to evaluate their performance. Second, in organisations with a high turnover rate, it is less likely that the immediate superior will evaluate worker performance. This result points to the fact that in firms where there are frequent changes in the

workforce, it is difficult for the immediate superior to monitor worker performance. Regarding the job control variables, no evidence to support a relationship between the degree of autonomy of workers and the person who evaluates performance has been found. As far as the complementary practices are concerned, a positive impact of the use of pay for individual performance on the Immediate Superior variable is shown. Moreover, the explanatory variable correlates negatively with the probability that performance appraisal is conducted by another line manager and a person from the HRM department. This finding is consistent with our belief that employers may use both pay for individual performance and formal appraisal as part of a monitoring and compensation system that can be carried out by the worker's immediate superior. Training also has a negative influence on the probability that a person from the HRM department carries out the appraisal. According to Brown and Heywood (2005), workers who have received training are more productive than other employees. Therefore, it may be beneficial for the employer to observe them closely in order to avoid significant productivity losses. Consequently, a person from the HRM department may not be well-suited to carry out the monitoring of trained workers because such a figure who has limited with the employee in comparison to an immediate superior or a manager at a higher level. We find that the size of the establishment is positively related to the probability that an immediate superior carries out the evaluation, and it correlates negatively with the Another Line Manager and Person From HRM Department variables. Since large establishments have monitoring difficulties due to extensive chains of command, it is plausible to think that they prefer to assign this task to a person who can observe worker performance closely.

The results of the determinants of the frequency of performance appraisal provide mixed support for our hypotheses (see Table 5); the turnover rate of the establishment favours a higher frequency of evaluation, but the rest of variables representing workforce characteristics do not emerge as statistically significant in the analysis. These results indicate that when the turnover of workers in the establishment is high, the employer is interested in a frequent evaluation of workers. This frequent evaluation may be due to monitoring concerns or to the need to assign new workers to jobs. Contrary to the expected outcome, no positive effect of the number of supervisors on the frequency of appraisal has been found. The findings show that the adoption of a system of pay for individual performance

correlates negatively with the dependent variable. As a possible explanation of this result, we have already mentioned that evaluation for administrative purposes such as pay determination is usually carried out with a lower frequency than developmental appraisal (see Murphy and Cleveland, 1995).

Finally, the results concerning the structural factors of the establishment are as follows. The proportion of labour costs correlates positively with frequency of appraisal, but the size of the establishment emerge as a negative determinant of the dependent variable. As stated in the theoretical section, the presence of a HRM department negatively influences the periodicity of appraisal. In addition, performance evaluation is more frequent as union influence increases. Overall, the results concerning the effect of union influence on the dependent variables suggest that, contrary to the expected outcome, unions do not oppose the use of performance appraisal. In fact, our findings suggest that unions promote the adoption of a formal system of appraisal carried out with a high frequency, which is in line with the results offered by Addison and Belfield (2008). The adoption of a formal system of performance appraisal implies that evaluation is determined according to an established procedure. This formal procedure may contribute to reducing arbitrariness in the evaluation process, and arbitrariness in decision-making is a condition that unions try to avoid.

CONCLUSIONS

We have drawn upon the work of Brown and Heywood (2005) and Addison and Belfield (2008) in this study to analyse the implementation of performance appraisal systems in the Spanish manufacturing industry. In contrast with these previous studies, our work is not limited to the analysis of the relationship between establishment characteristics and the use of performance evaluation. Our main focus was to examine how establishment features correlate with the dimensions that shape a formal performance appraisal system. The idea that underlies this analysis is that the attributes of an organisation influence not only the decision to adopt a system of performance appraisal but also its particular configuration.

According to our estimations, the adoption of a system of pay for individual performance and the provision of training exert a positive and significant influence on the probability of adopting

performance appraisal. Moreover, the two explanatory factors have an influence on the dimensions of appraisal considered in this study. As mentioned above, there is an extensive body of research that advocates the joint implementation of certain HRM practices in order to obtain improvements in organisational performance and worker outcomes (see Kato, 2006, for a review of studies on these topics). Among these practices, formal performance appraisal, pay for performance systems and the provision of training have been identified jointly with information sharing, participation and comprehensive selection (see Huselid, 1995; or Becker and Gerhart, 1996). Although we have not accounted for the adoption of additional HRM practices, the use of pay for performance and the provision of training are considered to be crucial elements in an effective process of performance management (see Dransfield, 2000).

For the other three groups of explanatory variables included in the analysis, we obtain mixed results. In contrast with the findings in Brown and Heywood (2005) and Addison and Belfield (2008), the tenure hypothesis is not supported by our data. However, we find some significant correlations between the characteristics of the workforce and the configuration of performance appraisal. With the exception of the size of the establishment, neither the variables related to job control nor the structural features of the establishment seem to have a crucial role in explaining the adoption of performance appraisal systems. However, these explanatory variables significantly influence the dimensions of appraisal. More precisely, the job control factors are correlated to the performance measures, whereas the structural factors are significant determinants of the frequency of appraisal.

In general, significant differences are obtained with respect to the findings of the Australian and British studies. These differences point to a particular configuration of the process of formal performance appraisal in Spain in comparison with the other countries studied. However, understanding the implications of institutions for the adoption of HRM practices is a complex issue (see Godard, 2010). Despite the fact that the two contexts share certain common features, Brown and Heywood (2005) and Addison and Belfield (2008) also find significant differences in the factors that determine performance appraisal in Australia and Great Britain. These differences, in conjunction with the results of the present study, suggest that further research is needed regarding the use of performance appraisal systems and the influence of the institutional framework.

Although our study reflects certain caveats such as those inherent to the use of cross-section data, we provide evidence in favour of the idea that the characteristics of the establishment affect not only the decision to adopt formal performance appraisal but also the dimensions that shape the practice. Overall, we can conclude that additional work on the relationship between organisational circumstances and performance appraisal dimensions is needed, but we hope that this study contributes to a better understanding of the topic and encourages the development of future research on the configuration of performance appraisal.

REFERENCES

- Addison, John T. and Clive R. Belfield. 2008. "The Determinants of Performance Appraisal Systems: A Note (Do Brown and Heywood's Results for Australia Hold Up for Britain)." *British Journal of Industrial Relations* 46(3), 521-31.
- Baker, George, Robert Gibbons and Kevin J. Murphy. 1994. "Subject Performance Measures in Optimal Incentive Contracts." *Quarterly Journal of Economics* 109(4): 1125-56.
- Baron, James N. and David M. Kreps. 1999. *Strategic Human Resources. Frameworks for General Managers*. New York: John Wiley & Sons, Inc.
- Bayo-Moriones, Alberto and Jose E. Galdon-Sanchez. 2010. "Performance Appraisal, Business Strategy and Firm's Results." Manuscript.
- Becker, Brian and Barry Gerhart. 1996. "The Impact of Human Resource Management on Organizational Performance: Progress and Prospects." *Academy of Management Journal* 39(4): 779-801.
- Bohlander, George and Scott Snell. 2009. *Managing Human Resources*. South Western: Thompson.
- Boswell, Wendy R. and John W. Boudreau. 2002. "Separating the Developmental and Evaluative Performance Appraisal Uses." *Journal of Business and Psychology* 16(3): 391-412.
- Brown, Michelle and John S. Heywood. 2002. "Paying for Performance: Setting the Stage." in *Paying for Performance: An International Comparison*, edited by Michelle Brown and John S. Heywood, pp. 31-16. Armonk, NY: M.E. Sharpe Publishers.
- Brown, Michelle and John S. Heywood. 2005. "Performance Appraisal Systems: Determinants and Change." *British Journal of Industrial Relations* 43(4), 659-79.
- Drago, Robert W. and John S. Heywood. 1995. "The Choice of Payment Schemes: Australian Establishment data." *Industrial Relations* 34(4): 507-531.
- Dransfield, Rob. 2000. *Human Resource Management: Studies in Economics & Business*. Harcourt Heinemann.
- Fletcher, Clive. 2001. "Performance Appraisal and Management: The Developing Research Agenda." *Journal of Occupational and Organizational Psychology* 74(4): 473-87.

- Godard, John. 2010. "What is Best for Workers? The Implications of Workplace and Human Resource Management Practices Revisited." *Industrial Relations* 49(3): 466-88.
- Grund, Christian and Dirk Sliwka. 2009. "The Anatomy of Performance Appraisals in Germany." *The International Journal of Human Resource Management* 20(10): 2049-65.
- Heywood, John S., W. Stanley Siebert and Xiangdong Wei. 1997. "Payment by Results Systems: British Evidence." *British Journal of Industrial Relations*, 35(1): 1-22.
- Heckman, James. 1979. "Sample Selection Bias as a Specification Error." *Econometrica* 47(1): 153-61.
- Huselid, Mark A. 1995. "The Impact of Human Resource Management Practices on Turnover, Productivity and Corporate Financial Performance." *Academy of Management Journal* 38(3): 635-72.
- Ichniowski, Casey, Kathryn Shaw and Giovanna Prennushi. 1997. "The Effects of Human Resource Management Practices on Productivity: A Study of Steel Finishing Lines." *American Economic Review* 87(3): 291-313.
- Jirjahn, Uwe and Gesine Stephan. 2004. "Gender, Piece Rates and Wages: Evidence from Matched Employer-Employee Data." *Cambridge Journal of Economics* 28(5): 683-704.
- Kato, Takao. 2006. "Determinants of the Extent of Participatory Employment Practices: Evidence from Japan." *Industrial Relations* 45(4): 579-605.
- Lazear, Edward P. 1998. *Personnel Economics*. Cambridge: MIT Press.
- Levy, Paul E. and Jane R. Williams. 2004. "The Social Context of Performance Appraisal: A Review and Framework for the Future." *Journal of Management* 30(6): 881-905.
- Milkovich, George T. and Alexandra K. Wigdor. 1991. *Pay for Performance: Evaluating Performance Appraisal and Merit Pay*. Washington DC: National Academy Press.
- Murphy, Kevin R. and Jeanette N. Cleveland. 1991. *Performance Appraisal: an Organisational Perspective*. Boston: Allyn & Bacon.
- Murphy, Kevin R. and Jeanette N. Cleveland. 1995. *Understanding Performance Appraisal: Social, Organisational, and Goal-Based Perspectives*. Thousand Oaks CA: Sage.

- Nurse, Lawrence. 2005. "Performance Appraisal, Employee Development and Organizational Justice: Exploring the Linkages." *The International Journal of Human Resource Management* 16(7): 1176-94.
- Prendergast, Canice. 1999. "The Provision of Incentives in Firms." *Journal of Economic Literature* 37(1): 7-63.
- Shields, J. 2002. "Performance Related Pay in Australia." In *Paying for Performance: An International Comparison*, edited by Michelle Brown and John S. Heywood, pp. 31-16. Armonk, NY: M.E. Sharpe Publishers.
- Wall, Toby D., Jonathan Michie, Malcolm Patterson, Stephen J. Wood, Maura Sheehan, Chris W. Clegg and Michael West. 2004. "On the Validity of Subjective Measures of Company Performance." *Personnel Psychology* 57(1): 95-118.
- Werner, Jon M. and Mark C. Bolino. 1997. "Explaining U.S. Courts of Appeals Decisions Involving Performance Appraisal: Accuracy, Fairness and Validation." *Personnel Psychology* 50(1): 1-24.
- Wooldridge, Jeffrey M. 2003. *Introductory Econometrics: A Modern Approach*. South-Western: Cincinnati.

TABLES

TABLE 1. Variable Definition and Descriptive Statistics

Variable	Definition	Mean	Standard Deviation
Dimensions of a formal system of performance appraisal			
Performance Appraisal	1 if any formal system of performance appraisal is used for at least 50 per cent of production workers; 0 otherwise.	0.371	0.483
Measures	1 if appraisal is based on both objective and subjective criteria; 2 if appraisal is based only on objective criteria; 3 if appraisal is based only on subjective criteria	2.481	0.626
Immediate Superior	1 if the process of appraisal is carried out by an immediate superior; 0 otherwise.	0.528	0.500
Another Line Manager	1 if the process of appraisal is carried out by another line manager; 0 otherwise	0.354	0.479
Person From HRM Department	1 if the process of appraisal is carried out by a person from the HRM department; 0 otherwise	0.280	0.450
Frequency	1 if appraisal is carried out biennially; 2 if appraisal is carried out annually; 3 if appraisal is carried out biannually; 4 if appraisal is carried out quarterly or with a higher frequency;	1.788	0.952
Explanatory factors			
Percent Casuals	Percentage of production workers that are casual workers.	14.014	16.264
Percent Female	Percentage of production workers that are female.	22.465	25.715
Percent Over 50	Percentage of production workers that are over 50 years old.	17.025	16.989
Turnover	Percentage of production workers that stopped working in the establishment in the last year.	9.967	13.417
Autonomy	Degree of autonomy of production workers over their work.	4.609	2.099
Supervisors Per Worker	Average number of supervisors per production worker.	0.093	0.090
Individual Pay For Performance	1 if pay based on individual performance is used for production workers; 0 otherwise.	0.348	0.477
Training	Percentage of production workers that received off-the-job training in the last year.	37.825	35.834
HRM Department	1 if there is a department at the establishment or firm that deals with HRM issues; 0 otherwise.	0.712	0.453
Labour Costs	Percentage of labour costs over total production costs.	31.673	17.220
Size	Number of workers at the establishment (logarithm).	4.780	0.787
Union Influence	Employer's perception of union influence over production workers: 1 if very low influence; 2 if low influence; 3 if medium influence; 4 if high influence; 5 if very high influence.	2.910	1.151
Industrial Sector	12 manufacturing categories included		

TABLE 2. Determinants of the Use of a Formal System of Performance Appraisal

Variable	Use of a Formal Performance Appraisal System
Constant	-1.750*** (0.429)
Percent Casuals	-0.573 (0.393)
Percent Female	0.015 (0.230)
Percent Over 50	-0.262 (0.319)
Turnover	0.167 (0.417)
Autonomy	0.034 (0.026)
Supervisors Per Worker	-0.867 (0.650)
Individual Pay For Performance	0.461*** (0.109)
Training	0.357** (0.155)
HRM Department	0.074 (0.130)
Size	0.186** (0.075)
Union Influence	-0.045 (0.049)
Labour Costs	0.184 (0.311)
Industry Controls	Yes
Chi-squared	51.44***
Log likelihood	-403.36
Number of observations	646

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

Note: Standard errors are reported in parentheses.

TABLE 3. Determinants of the Measures Used to Evaluate Performance

Variable	Formal Performance Appraisal is Based on Objective Criteria	Formal Performance Appraisal is Based on Subjective Criteria
Constant	1.392 (0.934)	0.129 (1.425)
Percent Casuals	1.917* (0.999)	2.002 (1.389)
Percent Female	0.000 (0.492)	1.054* (0.632)
Percent Over 50	0.486 (0.747)	0.277 (1.114)
Turnover	-0.981 (1.176)	-0.881 (1.722)
Autonomy	-0.133** (0.062)	-0.105 (0.087)
Supervisors Per Worker	-5.953*** (2.247)	-1.727 (3.050)
Individual Pay For Performance	-0.075 (0.243)	-0.038 (0.349)
Training	-0.507 (0.341)	-0.360 (0.480)
HRM Department	-0.393 (0.320)	-0.226 (0.442)
Size	-0.103 (0.182)	-0.200 (0.278)
Union Influence	0.036 (0.113)	-0.081 (0.162)
Labour Costs	0.835 (0.711)	0.684 (0.960)
Chi-squared	24.94	
Log likelihood	-211.093	
Number of observations	248	

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

Notes: The reference category is "Formal Performance Appraisal is Based on both Objective and Subjective Criteria"
Standard errors are reported in parentheses

TABLE 4. Determinants of the Person Who Carries Out Formal Performance Appraisal. Probit Regressions

Variable	Immediate Superior	Another Line Manager	Person from HRM Department
Constant	-2.329*** (0.460)	1.832*** (0.446)	1.683*** (0.427)
Percent Casuals	-0.478 (0.503)	0.652 (0.483)	-0.094 (0.448)
Percent Female	0.056 (0.224)	0.207 (0.221)	0.022 (0.222)
Percent Over 50	-0.461 (0.366)	0.591* (0.351)	0.362 (0.342)
Turnover	-1.075* (0.629)	0.446 (0.532)	0.538 (0.520)
Autonomy	0.049 (0.031)	-0.029 (0.030)	-0.010 (0.028)
Supervisors Per Worker	-0.728 (0.890)	1.222 (0.838)	0.201 (0.821)
Individual Pay For Performance	0.238** (0.120)	-0.330*** (0.115)	-0.306*** (0.116)
Training	0.222 (0.168)	0.024 (0.165)	-0.311** (0.118)
HRM Department	-0.001 (0.151)	-0.077 (0.146)	0.133 (0.145)
Size	0.279*** (0.087)	-0.267*** (0.088)	-0.216*** (0.082)
Union Influence	0.010 (0.055)	0.044 (0.053)	0.018 (0.051)
Labour Costs	0.006 (0.347)	-0.118 (0.340)	-0.227 (0.342)
Chi-squared	32.63***	33.36***	25.96**
Log likelihood of observations	-561.29 245	-553.25 245	-531.08 245

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

Note: Standard errors are reported in parentheses

TABLE 5. Determinants of the Frequency of Formal Performance Appraisal. Ordered Probit Regression

Variable	Frequency of Formal Performance Appraisal
Percent Casuals	-0.063 (0.644)
Percent Female	-0.039 (0.314)
Percent Over 50	-0.134 (0.491)
Turnover	1.630** (0.783)
Autonomy	0.011 (0.040)
Supervisors Per Worker	-0.189 (1.341)
Individual Pay For Performance	-0.301* (0.155)
Training	0.017 (0.214)
HRM Department	-0.367* (0.208)
Size	-0.214* (0.116)
Union Influence	0.177** (0.073)
Labour Costs	0.010** (0.466)
Chi-squared	28.25**
Log likelihood of observations	-248.69 233

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

Note: Standard errors are reported in parentheses