INTERNAL PROMOTION VERSUS EXTERNAL RECRUITMENT: EVIDENCE IN INDUSTRIAL PLANTS

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ABSTRACT:

An analysis of the factors related to the use of internal promotion of blue-collar workers to positions as supervisors and skilled technicians compared to external recruitment was carried out on a sample of 653 Spanish industrial plants. The use of internal promotion is positively correlated with variables indicating the efforts made by plants to measure employees' skills as well as with the level of specificity of investment in human capital made by blue-collar workers. Contrary to what was expected, variables related to the use and efficiency of other incentive systems have no significant influence on the degree to which internal promotion is used. These results are preliminary evidence that internal promotions are used to protect and favor specific investments, especially those made by firms in order to find out their workers' skills.

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The use of internal promotions has been one of the basic premises of influential economic models of the firm and their internal incentive systems, as evidenced by "tournament theory" (Lazear and Rosen 1981) and career models in organizations (Gibbons and Waldman 1999). Various models have also provided theoretical explanations for the use of internal promotion (Chan 1996; Fairburn and Malcomson 2001; Waldman, 2003) and its consequences (Prendergast 1993).

This theoretical development stands in contrast to the scant empirical evidence available (Pergamit and Veum 1999: 82). In the area of economics, most research has focused on studying the factors determining the likelihood of a worker obtaining internal promotion and the benefits this has for the worker. The evidence has been taken from various sources: data from a particular organization (Baker et al. 1994; Asch and Warner 2001; Treble et al. 2001), data from a sample of the general population (McCue 1996; Pergamit and Veum 1999), a combination of both (Abraham and Medoff 1985), and data from a particular profession (Broder 1993; Spurr and Sueyoshi 1994). Although the external market's influence and importance is accepted[1], the type of data examined in these studies offers little scope for questioning the factors affecting whether, once the vacancy arises, firms decide to use internal promotion instead of external recruitment.

In management literature, there are some studies analyzing the factors determining the implementation of internal labor markets (e.g. Baron et al. 1986; Pfeffer and Cohen 1984). In these studies, the presence of internal labor markets is measured using many different features, with no clear theoretical justification for their interrelations apart

from the descriptive study by Doeringer and Piore (1971), in which internal promotion is one of the dimensions of internal labor markets.

For this reason, a clear and isolated analysis of the factors related to the use of internal promotion is necessary in order to establish the reliability of the assumptions made by the theoretical models and the development of future explanations of their use. This study is an initial attempt to provide empirical evidence on the main factors correlated to the use of internal promotion as opposed to the external recruitment of workers. To this end, the internal promotion of blue-collar workers is analyzed and compared to the external hiring of supervisors and skilled technicians in a broad sample of Spanish manufacturing plants. This involves focusing on one of the various types of promotions noted by Pergamit and Veum (1999), namely, the one involving a change in the worker's tasks. This type of promotion has received the most attention from a theoretical standpoint due to the possible tension between provision of incentives and optimal allocation of individual skills to productive tasks (Baker et al. 1988, Waldman 2003).

The paper is organized as follows. The first section reviews the main theoretical arguments used to explain the implementation of internal promotions from an economic point of view. This analysis enables us to develop a series of hypotheses that will guide the subsequent empirical work. These hypotheses have been tested using a sample of 653 Spanish manufacturing plants, which are described in greater detail in the second part of the study. The results of the empirical tests are presented in the third section. The article ends with a discussion of the results obtained and the final conclusions.

[1] Pergamit and Veum observe approximately the same frequency of internal promotions as inter-company

THE ECONOMIC ANALYSIS OF PROMOTIONS

Former analyses of hierarchical organizations (Rosen 1982; Waldman 1984) emphasize the idea that most talented workers are most productive if they are at the top of the hierarchy; thus, workers will be assigned to job positions according to their talent and skills[2]. This is an explanation of how people may recover their investment in training and human capital, and therefore of their incentives for making these investments. Thus, inside and outside candidates with the same level of human capital, talent or skills will have the same likelihood of occupying vacancy in a firm.

Doeringer and Piore's (1971) descriptions of internal labor markets cast some doubt on this statement. Since then, several economists have developed different models in order to explain the choice of internal candidates as opposed to external ones, even when internal candidates have a lesser human capital endowment. Chan (1996) and Waldman (2003) sum up this literature in three main explanations: specific human capital, less information on outside candidates, and the use of internal promotions as a mechanism to reward prior performance.

Specific human capital

The opportunity to develop knowledge or abilities specific to the workplace was taken into account in the initial formulations of human capital theory (Becker 1964) and subsequently studied and documented for blue-collar workers (Topel 1991; Felli and Harris 1996). In the case of blue collar workers, a greater use of internal promotions is expected when part of the human capital needed to develop the tasks can be only

job changes.

acquired inside the firm (Becker 1964). Covering the vacancy with someone who already works in the organization leads to savings in training costs regarding specific aspects of the company. Consequently, in those plants where specific human capital is important for carrying out tasks, an increased use of internal promotion of blue-collar workers as opposed to external hiring is to be expected. Kahn and Huberman (1988) and Prendergast (1993) put forward the opposite argument. Commitment to promoting internal candidates acts as a mechanism for enhancing workers' specific investments when those investments are difficult to verify, and consequently difficult to directly compensate for their acquisition. While, in human capital models, internal promotion is a mechanism for taking advantage of those specific investments already made, in these models (Kahn and Huberman 1988; Prendergast 1993), internal promotion is a firm commitment made before the specific investment takes place, precisely in order to encourage such investment. However, despite these differences, both arguments predict a positive relationship between internal promotion and specific investment.

HYPOTHESIS 1: The likelihood of internal promotion will be greater in those plants with higher requirements of plant-specific human capital.

By definition, the existence of specific human capital implies that there is "a wedge between the lowest wage for which an employee will work and the highest wage the employer will pay... the boundaries of the wedge... depend on what alternative market opportunities are available to the employer and employee" (Malcomson, 1997, 1916). From the five causes of specific investments generally identified in the literature, namely specialized physical assets, specialized human assets, site specificity, dedicated

[2] A basic assumption in these models is that workers' skills are perfectly observable.

assets and brand-name capital (Williamson, 2002, 176), two of them seem to be especially key in the case of employment relationships: site specificity, related to the location of the plants, and specialized human assets, mostly related to technological differences among plants.

The location of the plants has been one of the main arguments used in the literature to explain the existence of specific investments (Joskow 1985). Applied to the case of human capital, workers make investments in abilities and knowledge related to the activities of the plant. The greater distance of location for alternative plants where this knowledge can be used (for example those with similar technology) and the greater the costs of displacement, the higher the degree of specificity of these investments. From the perspective of the firm, this also makes it more complicated to attract workers from the outside. The pool of external applicants is made up of workers that live far from the workplace and will thus require high economic compensation to be willing to move to another area.

It seems that the technological differences among competing firms would be low in a world where knowledge usually spreads quickly. However, several authors (Pfeffer and Cohen 1984; Osterman 1987; Morita 2001) suggest that this is not the case in light of continuous process improvements and technological changes. These arguments can be found in Doeringer and Piore (1971): "Line supervision, and sometimes operatives and maintenance crews as well, are forever modifying equipment in order to improve its efficiency. Such changes accumulate quickly and can produce considerable movement toward specificity" (p. 17).

Specific investments generate a rent to continued employment. If the division of the rent depends on the return on an investment undertaken by the employee, bargaining may

result in the firm capturing some of that return, or *hold-up* as Oliver Williamson (1985) termed it. As a result, the employee may invest less than would be efficient. If hold-up problems are important, one would expect to see the use of contracts that reduced these problems. Malcomson (1997) reviews the main contributions of the field for understanding labor markets: the main idea is that contracts can protect investors from possible expropriations. As Joskow (1987) empirically shows, under these circumstances the length of the contract will be related to the size of those possible expropriations and consequently the magnitude of the specific investments. In the case of the employment relationship, a permanent labor contract is more appropriate than temporary contracts for promoting specific investments.

According to Hypothesis one, the lack of nearby plants with similar technologies, along with technological changes and the presence of permanent employment relationships will be positively correlated with the use of internal promotions.

Private information and adverse selection

The second theoretical explanation provided by economic analysis for the use of internal promotions instead of external recruitment (see Novos, 1992) is based on learning models (Harris and Holmstrom, 1982; Farber and Gibbons 1996) and adverse selection (Spence 1973). The basic idea is that workers' skills are not easy for firms to notice, but may be discovered over time. In this process, the firms where workers are currently working can implement different mechanisms in order to learn about workers' abilities and consequently have better information than potential alternative employers. At this point, adverse selection problems like those analyzed by Greenwald (1986) appear in the labor market. The consequence is a reduction in inter-firm mobility, given that firms

have an interest in retaining more capable workers; bearing this in mind, the remaining firms will offer very low wages to movers.

HYPOTHESIS 2: The probability of internal promotions is greater in those plants with better information about their workers' skills.

Most of the literature related to human resources management (see for example, Milkovich and Boudreau 1996), characterizes the mechanisms firms use to gather information about workers at the different stages in the employment relationship. During the selection process, the use of curriculum vitae is well established, in which workers disclose to all firms relevant information about their abilities. Psychological tests are also frequently used, in which firms gather private information about worker's abilities that are more difficult to observe, such as personality or teamwork skills or their ability to acquire new knowledge. Moreover, while working, firms can have in place different mechanisms not available to alternative employers for gathering information about workers' performance inside the firm. As these psychological tests and appraisal systems are implemented by firms, current firms tend to have a greater informational advantage over other firms, and consequently more internal promotions.

Moral hazard

The third explanation for the use of internal promotions is related to tournament theory, in which promotions are understood as mechanisms to encourage worker's efforts through competition (Lazear and Rosen 1981). Waldman (2003) formalizes the idea that firms can take advantage of self-commitment to promote internal candidates over

outsiders, even though at the time of promotion external recruitment might be chosen. In this context, the firms' self-commitment to promote internal candidates has the advantage of eliciting workers' efforts (Chan 1996) and the disadvantage of promoting workers less capable than external candidates. This leads to the following hypothesis.

HYPOTHESIS 3: The use of internal promotion will be greater in those plants where the profits from the incentives provided to current blue-collar workers are higher.

Obviously, in contexts in which workers' behavior can be perfectly monitored, there are no advantages to internal promotions as motivational devices, as there are with other incentive mechanisms. Therefore, the more closely workers are supervised, the lower the profits from the incentives generated by internal promotion or other mechanisms.

Furthermore, it should also be taken into account that as an incentive system, promotions have the disadvantage of being an individual reward; therefore, they are not well-suited to environments where collaboration between workers is necessary (Lazear 1989). Since employees can work to sabotage their rival's performances (Chen 2003), in manufacturing environments in which collaboration among employees is important, systems rewarding individual performance do not seem to be the most appropriate (Drago and Garvey 1997). As a result, the profits from internal promotions as incentive mechanisms will be lower in plants with a greater need for collaboration or teamwork.

In the theoretical arena, the most fruitful debate has been why internal promotion can be the most efficient mechanism when there are other devices, such as variable pay, to reward individual performance. Various authors argue that the main advantage of promotion is that it avoids failure on the part of employers to provide the consequent

rewards after workers have made an unobservable effort (Carmichael 1983; Prendergast 1993). The reason is that the total amount of payments is fixed initially and does not change with decisions on promotion. This does not happen with bonuses, where firms may have an incentive to claim that workers have not performed adequately.

Internal promotions are also less susceptible to the potential for supervisors to give in to pressure from their subordinates when implementing rewards. This is because the choice of worker for the promotion in question has long-term consequences for those making promotion decisions (Fairburn and Malcomson 2001).

As a consequence, the increased use of tournaments, that is, internal promotion as an incentive system, is to be anticipated in those firms where the employer's or manager's credibility is lowest in terms of respect for the conditions established in incentive systems such as bonuses (Malcomson 1984). Another positive aspect of promotions is that, since they are relative evaluations, they help to eliminate risks to workers' wealth (Green and Stokey 1983). Moreover, obtaining information is less costly, as it does not require an exact quantification of the individual result obtained (Lazear and Rosen 1981). Gibbs (1995) models the optimal pay-for-performance scheme when promotion premiums exist, emphasizing the idea of substitutability. The greater the promotion premiums, the less necessary other incentives are. At the theoretical level, all these studies have viewed the use of other incentive mechanisms as reducing the profits from incentives generated by internal promotions.

Consequently, based on Hypothesis three, we can expect that the use of internal promotion will decrease with the degree of worker supervision, the need for workers to collaborate and the presence of alternative incentive mechanisms.

All the theoretical arguments above have been developed under different assumptions about the presence of specific knowledge and the availability of information about workers' abilities and efforts. Figure 1 synthesizes these.

<Insert figure 1>

Other considerations

In traditional tournament models (Lazear and Rosen 1981), efficient level of effort can be obtained with the appropriate combination of wage differences (winner prizes) and number of candidates for the prize, that is, the span of control. Zábojnik and Bernhardt (2001) suggest that, in most cases, firms cannot make binding long-term employment contracts, so the wages are determined by spot markets. Thus, the span of control will be the main incentive mechanism for firms using internal promotion. Firms with less competitive product markets will obtain greater profit margins; for such firms, then, it is optimal that their workers should exert greater effort. This effort can be obtained with greater span of control or with firm size, given that more candidates will go after the same prize.

Pfeffer and Cohen (1984), in an empirical study of the implementation of internal labor markets in a sample of industrial establishments, argue that external pressures like those borne in state-owned or unionized firms can favor certain decisions, such as the use of internal promotions, even though in some cases they are not the most efficient. Therefore, the empirical estimates will have to control for all these aspects.

On the other hand, other studies propose alternative relationships to those postulated here. Osterman (1994, 2000) argues that there could be a positive relationship between the use of high-performance work practices and internal promotions. High-performance

work systems comprise alternative work design practises, such as broad job definitions and formal participatory practises, such as employee problem solving groups, aimed at attaining a more flexible organization through encouraging worker commitment (Osterman, 1994; Godard, 2004). To the extent that internal promotions, in conjunction with other human resources practices such as incentive payment, contribute to achieving stable, motivated and skilled workers (Lepak and Snell 2002), they could enable the firm to implement successful high-performance work practices (Barnard and Rogers 2000). These arguments seem to suggest that incentives and internal promotions are complementary, not substitutes as follows from Hypothesis 3. There are plants that require different levels of effort from their workers and, consequently, can have at the same time greater incentives and use more internal promotions. The following sections aim to empirically test all of these arguments.

METHODS

Data

The information for testing the hypotheses was obtained by including specific questions in a broader questionnaire focused on the analysis of new work and production organization systems in the Spanish manufacturing industry. The type of questionnaire is quite similar to that used by Osterman (1994, 2000) for analyzing the various aspects of internal labor markets and work organization in American firms.

The information was gathered between March and December 1997, and it refers to a representative sample of Spanish manufacturing plants with 50 or more workers. The questionnaires were filled out at personal interviews at the factories, in most cases with plant directors or operations and human resources managers. A total of 965 valid

interviews took place, accounting for 16.04% of the total target group. Due to the fact that some questionnaires were incomplete, the final number of observations used in this article was 653, with all manufacturing sectors represented (see Table 1 for details). More detailed information on the survey and how it was obtained can be found in Appendix 1 and in Bayo-Moriones and Huerta-Arribas (2002).

Measures and variables

The lack of empirical studies on the subject clearly shows the difficulty of gathering information and directly observing most of the theoretical concepts examined above. As was the case in previous studies on promotions (Abraham and Medoff 1985), and as is common in studies analyzing various aspects of firms' personnel policies (Levine 1993; Drago and Garvey 1998), many of the concepts were measured using subjective assessments by the interviewee on various scales. This kind of question ensures the answer when objective information is not easily available from the head of the plant and consequently makes possible a wider sample of plants. The variables used in this study are described below.

Dependent variable

In order to understand the extent of the use of internal promotions, questions were asked about the source of the current supervisors and skilled technicians at the plant. The interviewee had five alternative answers on the proportion of supervisors and skilled technicians[3] that had previously been blue-collar workers at the plant: (0) practically none, representing 5.83% of the sample; (1) less than half, 15.16% of the sample; (2) approximately half, 12.55% of the sample; (3) more than half, 35.68% of the sample;

[3] From the pretest prior to the fieldwork we identified the promotion to supervisor or skilled technician as the main path of promotion for blue-collar workers in manufacturing plants in our population.

and (4) practically all, which represents 30.78% of the sample. The variable finally used in all the empirical analysis, *Internal Promotions*, is an ordinal one with the five levels described above (0-4).

Independent variables.

Concerning the presence of knowledge specificity (Hypothesis 1), there were three main observable implications derived from the theoretical section above: the cost of finding alternative plants with similar technologies, the extent of technological changes and the presence of permanent employment relationships.

The cost of finding alternative plants to work at is basically related to physical distances, mostly within Spain, where these movements seem to be more costly than in other countries due to the extremely low propensity of workers to move geographically[4] (Antolin and Bover 1997 or Devillanova and García-Fontes 1998). For that purpose, we gathered information on the existence of any plants falling within the same two-digit National Classification of Economic Activities (CNAE) group within the same province. The variable *Locational Specificity* equals 1 when there are no other plants in the same economic sector in the geographical area (province) where the plant is located, and zero otherwise.

The extent of technological changes at the plant was evaluated by the interviewee. Based on events during the past three years, the interviewee had to choose one of the five following options: there were no changes, the changes were minor, they were fairly significant, they were major or the production system changed completely. Therefore, the variable *Technological Changes* is an ordinal scale from one, no changes, to five, a complete change in the production system.

Finally, the variable *Permanent Contracts* has been defined as the percentage of non-temporary workers at the plant.

From Hypothesis 1 we expect a positive relationship between the use of internal promotions and *Locational Specificity*, *Technological Changes* and *Permanent Contracts*.

In terms of firms' efforts to gather information about workers' skills in order to use it for internal purposes (Hypothesis 2), two questions were included in the questionnaire. The first is related to the efforts made during the hiring process, and the second refers to efforts made during the period the employees work at the firm.

Related to the efforts made during the hiring process, we focus on the factors that are usually taken into account when initially selecting and hiring blue-collar workers. The person interviewed had six alternatives to choose from: experience, qualifications, age, ability to acquire new knowledge, personality and ability to work in a team. When one of the last three criteria was considered to be the most important, the variable *Unobservable Characteristics* assumes the value of one; otherwise it takes the value zero.

Finally, the questionnaire contains information about the extent of appraisal systems of current workers in the plant. The person interviewed assessed on a scale of 1 (none) to 5 (all of them) how many of the blue-collar workers are subject to a performance *Appraisal System*. The intermediate values correspond to a few (2), approximately half (3) and most (4) of the blue-collar workers.

From Hypothesis 2 we expect *Unobservable Characteristics* and *Appraisal Systems* to have a positive influence on internal promotions.

[4] The main explanations given by the cited authors for Spanish workers' low mobility are related to

Related to the role of internal promotions as an incentive mechanism to elicit unobservable effort (Hypothesis 3), we used three different variables. The first is related to the size of the problem, *Degree of Supervision*; the second to the need for collaboration between workers, *Teamwork*; and the last to the existence of alternative mechanisms to solve this moral hazard problem, *Incentives*.

The interviewee set a value on the degree of supervision to which blue-collar workers are subject in accordance with five categories: not supervised, barely supervised, moderately supervised, quite supervised and very closely supervised. An ordinal variable, *Degree of Supervision*, was created with the five categories above, in which a value of 1 shows that the workers are not supervised at all, and a value 5 shows that they are very closely supervised at work. The questionnaire also gathered information about the percentage of workers that carry out their work within autonomous work teams, *Teamwork.* We use a dummy variable, *Incentives*[5], with a value of one when the firm has incentive payment plans and zero otherwise.

From Hypothesis 3 we expect a negative relationship between the use of internal promotions and the variables *Degree of Supervision*, *Teamwork* and *Incentives.*

Control variables

Following the arguments of Zábojnik and Bernhardt (2001), Pfeffer and Cohen (1984) and Osterman (2000) set forth in the theoretical section, the following set of control variables was used:

housing expenditures and to institutional factors such as registration-system procedures at the Spanish Office of Employment.

[5] The questionnaire also contains information about the intensity of those incentives, defined as the percentage of worker compensation that is variable. The inclusion of this variable does not lead to important changes in the results obtained but reduces the number of observations. The estimations are available upon request.

The *Degree of Competition* is a binary variable equal to one when there are many competitors in the market in which the plant sells its products, and zero otherwise. The *Size* of the plant is measured by the number of employees at the plant. The *Span of Control* is defined as the average number of blue-collar workers under the control of the same supervisor. A dichotomous variable, *State-owned*, has a value of one if the state owns more than fifty percent of the firms' shares, and zero otherwise. The influence of *Unions* is captured by an ordinal variable in five categories which has a value of 1 when the influence of unions in the plant is very slight and a value of 5 when this influence is very strong.

The use of high-performance work practices is represented by the *HPWP* index. This variable shows how many of the following practices are implemented by the firm for blue-collar workers: improvement groups, job rotation, suggestion systems and meetings with the executives of the plant. These practices are representative of those examined in the literature on high-performance work systems (see for example Osterman 1994, MacDuffie 1995, Handel and Gittleman 2004). Therefore, the variable *HPWP* ranges from zero to four.

We also include other control variables related to certain characteristics of the data that can distort the interpretation of some of the results. The first is that in the early years of a company, supervisors and skilled technicians have to be externally recruited. In order to control for these cases, we use a dummy variable, *Recently Founded* plants, which has a value of 1 if the plant was founded less than five years[6] before the interview took place, and zero otherwise. The second is that in the sample used, internal promotion to supervisor only refers to people who were previously blue-collar workers at the same

plant. In fact, a distinction could be made between promoting a worker from the same plant to a managerial position, promoting a worker from another plant but the same company, and hiring workers with no links to the company. This distinction is only relevant for firms with various manufacturing plants. For that purpose, we include the variable termed *Other Plants in Spain*, which - as the name indicates - measures the number of other plants that the firm has in Spain. A problem with this variable is that we do not take into account the existence of other plants outside Spain. For this reason, and also taking into account the possible influence of cultural factors, we introduced a binary variable that assumes a value of 1 when the plant is part of a *Multinational* group; otherwise, this is zero.

Table 2 shows the mean and the standard deviation of the variables used, as well as their correlation matrix. The data clearly show that in the sample of industrial plants available, internal promotion is used to a greater extent than external hiring (2.70 > 2, the midpoint of the scale used). Six percent of the plants are less than 5 years old; the plants' average size is 226 employees; and the average percentage of long-term employment contracts is 80%. As far as the characteristics of the firm are concerned, 24% of plants are part of multinational companies, and only around 3% are state-owned, with moderate union influence. In 54% of the cases, this is not the firm's only plant in Spain, being 3.26 the average number of plants for such firms. Work organization is characterized by an average span of control of 16 blue-collar workers and a moderate degree of technological change. Only 17% of workers are members of work teams, and on the average two high-performance practices have been put into place. Forty-one percent of the plants say that they have many competitors, and only 5% state that there

[6] Following Pergamit and Veum (1999), if around the 20% of the workers obtains a promotion with an

are no other plants in the same manufacturing sector in the area. In terms of employment policies, 28% of the plants place the most emphasis on the unobservable characteristics of candidates to become blue-collar workers. Once workers have been employed, 66% of the plants use incentive plans to reward them, with medium-to-high degrees of supervision. On the average, firms evaluate the work of over half of their blue-collar workers.

RESULTS

Given that the variable relating to the use of internal promotion versus external recruitment is ordinal[7], we have estimated the ordered probit models (Maddala 1983) that are shown in Table 3.

Four models have been estimated. In the first, only the variables related to the existence of specific knowledge have been included. In the second model, variables clustered according to firms' private information about workers' abilities are included, while in the third, those relating to the presence and efficiency of other incentive systems appear. The fourth and final estimate includes all the independent and control variables defined.

The coefficients estimated in the final model, which are related to the hypotheses set forth, are quite similar to those estimated in previous models, meaning that no important collinearity problems between the independent variables were detected.

The variables related to Hypothesis 1 are jointly statistically significant at a level of 1%. All of them appear with the expected sign, and in two cases the coefficients are

increase in job responsibilities each year, five years is the time needed to replace all the supervisors at least once.

[7] The main results of the paper are maintained with different specifications of the dependent variable, such as a dummy variable taking a value of one when the majority or all the technicians and supervisors had previously been blue-collar workers in the plant. These estimations are available from the authors upon request.

significantly different from zero. In the case of the logarithm[8] for *Permanent Contracts*, it has a positive impact significant at the 1% level in this last model. *Technological Change* positively affects the degree of use of internal promotions as opposed to external hiring (around 5% significance), but no effect for *Locational Specificity* was detected.

The results shown in Table 3 clearly show that those variables previously related to Hypothesis 2 are jointly significant, with a significance level of 1%. The two variables have the expected signs and significance levels below 5%. Those plants using criteria that are more closely related to *Unobservable Characteristics* in the blue-collar worker hiring procedures are subsequently more likely to promote these same workers to supervisors. Also, the use of *Appraisal Systems* for a higher number of workers in the company corresponds to an increased use of internal promotions.

None of the variables related to the provision of incentives (Hypothesis 3) were significant in the models estimated. Despite the fact that the sign of the coefficients associated with the variables *Teamwork* and *Degree of Supervision* is that anticipated by the theoretical models, neither of them is significantly different from zero, nor is the one associated with the existence of *Incentive* plans.

Regarding the control variables, the most significant coefficient corresponds to *Degree of Competition*, which has a positive impact on the dependent variable. *Multinational* and the logarithm of *Size* are also significant in model 4. Being part of a multinational firm and the number of the firm's *Other Plants in Spain* have a negative influence on

[8] The number of employees appears in two variables, *Permanent Contracts* and *Size*. In order to avoid this problem, we will work with the logarithm of *Permanent Contracts* and *Size*. Take note that Log (permanent workers / number of employees) = Log (permanent workers) – Log (number of employees), so in fact, we are really estimating the effect of two variables, permanent workers and number of employees. When the variable *Size* is not included in the estimates, model 1, we are assuming that both variables, Log

the use of internal promotion, although in the last case this is not significant. In contrast, the logarithm for the number of employees has a positive and significant influence. The other control variables are not significant. Therefore, it can be concluded that in the sample analyzed, whether the plant has been *Recently Founded*, whether or not it is *state-owned*, the influence of *Unions* at the plant, the logarithm of *Span of Control*[9] and the adoption of high-performance work practices all have no effect on the use of internal promotions.

The influence of industrial sectors

Some of the variables analyzed may be heavily influenced by the manufacturing industry within which the plant operates. For this reason, it is advisable to consider whether the plants have full control over establishing their promotion policies, or whether these are determined by the characteristics of the industrial sector in which the plant conducts business. To this end, dummy variables have been introduced for the various sectors described in Table 1, with the sector of *Various Manufacturing Industries* being omitted in order to avoid problems of perfect collinearity. The results obtained are shown in Table 4[10].

The group of variables referring to industrial sectors is significant at the level of 1%. Once the remaining variables have been controlled for, the *Various Manufacturing Industries* sector is the one in which the greatest use of internal promotion takes place. There is, then, a group of industrial sectors (the textile industry, dressmaking, leather

(number of employees) and Log (permanent workers), have the same coefficient but different sign. When *Size* is included, model 4, we do not make any assumptions related to either coefficient.

[9] As span of control is made up of the division of two variables (number of blue-collar workers / number of supervisors), for the reasons given in footnote 8, we include it in the estimations in a logarithmic form.

[10] An intra-industry analysis has also been attempted, but the number of variables was too high for the small number of cases in each industry.

and footwear; wood and cork: paper, publishing and graphic arts; metallurgy and mechanical product manufacturing) in which this type of promotion is used to a lesser extent, but the differences with the above are not statistically significant. Differences with the omitted sector of around 10% are found in transport supplies, and below 5% significance are obtained in the following industrial sectors: food, drinks and tobacco; rubber and plastic materials; and electric, electronic and optical supplies and equipment. Finally, the chemical industry, the machinery and mechanical equipment and the non-metallic mineral products sectors are those that present the lowest use of internal promotion, with a coefficient significance of around 1%.

These results clearly show that the other variables maintain coefficients and significance levels similar to those mentioned above, with the exception of the variable *Size*, in which the coefficient is now not significant at the 10% level. The main relationships shown in the above section explain the intra-industry variation in the use of internal promotions.

DISCUSSION

The low explanatory capacity of the models analyzed seems a clear indication that internal promotion practices together with the other managerial practices analyzed here do not entail a whole, unique system that is optimal for all plants, unlike what was implicitly assumed in previous empirical studies on the determinants of internal labor markets, such as those by Baron et al. (1986) and Pfeffer and Cohen (1984).

Each plant adapts its promotion policies to its particular circumstances. Furthermore, most plants combine both policies, internal promotion and external hiring. Thus, the

study of those factors related to the greater use of internal promotions versus external recruitment is important in and of itself.

This evidence reinforces the importance of the theoretical research conducted to date along these lines, most of it described in the theoretical section of this paper. From a theoretical perspective, three explanations as to why firms might make greater use of internal promotions than external recruitment have been postulated: i) specific human capital; ii) private information and adverse selection; and iii) moral hazard problems. Consequently, some empirical research is called for in order to distinguish the importance of each of these explanations.

The evidence presented in this paper highlights the importance of specific investments, and in particular those investments made by firms to find out their employees' skills, which are the main factors related to the use of internal promotions in the sample of plants analyzed in this study. Despite what was expected, the use of internal promotion is scarcely influenced by the presence of alternative incentive systems, teamwork or different degrees of supervision.

The specificity of workers' skills has also appeared to be a relevant factor in the use of internal labor markets by other authors (Baron et al. 1986; Pfeffer and Cohen 1984). From a theoretical standpoint, site specificity and specialized human assets have been postulated as the main causes of human capital specificity. The empirical evidence shown only finds support for the latter explanation, human capital specificity, since the presence of similar plants in the same province has a statistically insignificant impact on the use of internal promotions.

The results above seem quite robust. The evidence comes from consolidated manufacturing plants, practically all more than five years old. The results are consistent

with several different definitions of the dependent and independent variables[11] and with the introduction of industry dummies, so they are good predictors of intra-industry variation in the use of internal promotions. We detect that multinational companies use internal promotion systems to a lesser extent. Besides the presence of cultural differences, in these companies some external promotions may come from blue-collar workers in the same company but from other plants[12]. We have also carried out the same analyses at those plants that do not belong to any multinational group and the results did not substantially change[13]. Therefore, the problem of identifying which plants belong to the same firm seems to have little impact on our main conclusions.

In spite of the robustness of the results for all the issues discussed above, the evidence obtained, as in any empirical study, has to be interpreted taking into account the characteristics of the sample, in this case a cross-sectional database referring solely to the lowest-level hierarchical promotions policies in manufacturing plants.

Due to the cross-sectional nature of the data, we have not been able to address questions as to why a given plant changes its policies. As a consequence, the empirical results describe the existing correlations between variables and do not allow for a clear distinction between causes and consequences. However, since most of the theoretical work is based on the characterization of games equilibria, at least the empirical results obtained are useful for illustrating the main characteristics of the existing equilibrium.

For example, from the positive relationship between internal promotions and the variables related to the presence of specific investments, we cannot determine whether internal promotions favor the accumulation of specific investments (Kahn and

[11] See footnotes 5 and 7.

[12] The negative sign for the number of *Other Plants in Spain* reinforces this explanation, although in this case the coefficient is not significant.

[13] These results do not appear in the text but are available upon request.

Huberman 1988 or Prendergast 1993), or whether internal promotions are favored by the presence of specific investments in human capital (Becker 1964).

The empirical evidence also suggests a positive correlation between the use of internal promotions and contexts of the firm's private information about their workers' abilities and consequently adverse selection in the labor market. Again, we cannot rule out the theoretical prediction that these problems imply a greater use of internal promotion (Novos, 1992) nor that a greater use of internal promotion implies higher investments in information acquisition.

However, if the use of internal promotion was the cause in all or some of the theoretical relationships set forth, we would expect significant correlations among the independent variables. This does not seem to be the case in our data, since the magnitude and significance level of the coefficients associated with the different variables do not undergo important changes when other sets of variables are included. Consequently, it seems that internal promotions are more the consequence and not the cause in the proposed relationships. Future panel data studies should help to address all of these questions.

The data refer to the lowest hierarchical level in the organizational chart of different Spanish industrial plants. At least at this level, the correlation between the use of internal promotions and the degrees of supervision, the existence of incentives or the presence of teamwork is statistically insignificant.

One possible explanation is that the negative effect proposed in Hypothesis 3 is neutralized by the positive effect suggested by Osterman's (1994, 2000) arguments; however, we do not believe that this is the case. It could be that our empirical context is one where workers' productivity seems to be very similar; thus, Osterman's arguments

would not apply. Moreover, we have introduced in the estimates an index related to the use of high-performance work practices, which is statistically insignificant. Therefore, the most plausible explanation is that firms do not use internal promotions to obtain the unobservable effort usually elicited by incentives. Similar conclusions are reached by Gibbs (1995) with data about workers in a single firm.

We cannot interpret this as evidence against the tournament theory, tested before in a broad set of more appropriate contexts[14], nor the use of tournaments as an incentive mechanism by the firms[15] or promotions as incentive mechanisms, for example to invest in human capital[16]. The evidence is against the specific use of internal promotions as a mechanism for eliciting the same kind of unobservable effort that has usually been attributed to short-term incentives. This can be interpreted as implying that the plants are near the ideal situation, in which incentives have little bearing on the process of covering vacancies. Promotions are mechanisms to encourage human capital investment, but firms try to dissociate, to the extent possible, the assignment processes of individuals to hierarchical levels from the provision of effort incentives. Further research will confirm whether our results can be generalized to other contexts such as other levels in the hierarchy or other occupations.

Finally, some Zábojnik and Bernhardt's (2001) predictions find little support. In most of the estimates, the span of control and the size of the plant are not statistically significant. On the other hand, the degree of competition is highly significant but with sign opposite to that proposed by the authors. Further theoretical research is needed to understand why the product market competition so strongly enhances the use of internal promotions.

[14] See for example Ehrenberg and Bognanno (1990) or Eriksson (1999) .
[15] For example, Pergamit and Veum (1999) show that 30% of internal promotions do not involve changes in the tasks of the promoted employees.
[16] See, for example, Gibbs (1995) for further details.

The presence of unions and state-ownership of plants do not appear to have a significant influence on either means of covering vacancies. These results are consistent with those obtained by Abraham and Medoff (1985) and Pfeffer and Cohen (1984), in which in practice managerial discretion is much greater than the restrictions that unions and state-ownership of plants theoretically appear to impose on the internal organization of manufacturing plants.

CONCLUSIONS

This article has analyzed those factors related to the choice of internal promotion versus external recruitment of workers when covering vacant positions in firms, in isolation from other characteristics of internal labor markets.

The paper provides evidence that it is important not to make assumptions concerning which elements make up a system such as internal labor markets; therefore, it is necessary to analyze the determinants of each of the elements both independently and in detail. This evidence confirms the appropriate direction taken in most of the theoretical work conducted to date by economists in the field.

Furthermore, evidence is presented about the three main explanations given by those theorists to explain why firms favor internal promotions over external hiring: specific human capital, private information and adverse selection, and moral hazard problems. We find support for the two first explanations, but not for the third.

The scant evidence available points to the need for further work to confirm our results in contexts other than the one analyzed here: the promotion of blue-collar workers to positions as supervisors or skilled technicians in Spanish manufacturing plants.

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Appendix 1. Definition of variables from the questionnaire[17].

Internal promotions

Referring to employee promotion processes at the plant, could you tell me whether the current supervisors and qualified technicians are former manual workers at this same plant?
1. Practically all; 2. Most; 3. Half; 4. A few; 5. Hardly any

Size

What is the total workforce of the plant?

State-owned

Can you give an approximate estimate of the percentage of state-owned shares in the ownership structure of your company?
State-owned takes a value of one if this percentage is greater than 50%, and zero otherwise.

Multinational

Does your company belong (totally or partially) to a multinational group?
Multinational takes a value of 1 if yes and 0 otherwise.

Other Plants in Spain

How many plants does your company have in Spain, in addition to this one?

Unions

How would you assess the influence of unions on the workers?
1. Very slight; 2. Slight; 3. Average; 4. Strong; 5. Very strong

Recently Founded

When was this plant founded?
Recently founded takes a value of one if the plant was founded in 1993 or later.

Degree of Competition

In the market in which this firm operates (regional, national, European, etc.), would you estimate the number of *competing firms* to be.
1. None, 2. Few, 3. A fair number, 4. Many.
Degree of Competition is a binary variable equal to one when the answer is 4 and zero otherwise.

Span of Control

How many manual workers on average have the same supervisor?

HPWP

Which of the following phrases best describes the situation at this plant with regard to task rotation among direct manual workers?
1. Manual workers are trained to do one job and virtually never change tasks; 2. Manual workers are trained for different jobs within the plant, but actually rarely change tasks; 3. Manual workers change tasks quite frequently but always within the same section; 4. Manual workers change from one section to another fairly regularly.
Rotation equals one if answer is 3 or 4.

Are any of the practices I am about to mention currently in use in order to involve workers or gain their commitment in the running and performance of this plant?
1. Suggestion systems from individuals; 2. Improvement groups; 3. Regular meetings to inform workers about company matters.

[17] This appendix only includes the queries that have been used to create the variables used in this paper. The full questionnaire is available upon request.

HPWP is the sum of rotation, suggestion systems, improvement groups and meetings.

Permanent Contracts

Number of permanent workers
Permanent Contracts is defined as number of permanent contracts / size

Technological Change

Have there been any significant technological changes over the last three years in your plant? In this respect, would you say that?
1. There has been no change; 2. There have been some minor changes; 3. There have been some fairly significant changes; 4. There have been some major changes; 5. The whole production system has been changed.

Locational Specificity

Are there any other plants belonging to the same sector in this province?
Locational Specificity takes a value of 1 if yes and 0 otherwise.

Unobservable Characteristics

I am now going to list some of the factors that are usually taken into account when recruiting and hiring new workers. In such circumstances, which of these factors is considered most important at this plant?
1. Previous experience; 2. Training; 3. Age; 4. Ability to acquire new skills; 5. Personality; 6. Teamwork skills.
Unobservable Characteristics takes a value of one if the answer is 4, 5 or 6.

Appraisal System

How many manual workers have their performance assessed?
1. None; 2. A few; 3. About half; 4. Most; 5. All.

Incentives

Do the manual workers at this plant receive any type of incentive payment?
Incentives takes a value of 1 if yes and 0 otherwise.

Degree of Supervision

Which of the following statements best describes the degree of supervision to which your employees are subject?
1. No supervision at all; 2. Hardly any supervision; 3. Moderate supervision; 4. Quite close supervision; 5. Close supervision.

Teamwork

What percentage of the blue-collar workers are members of autonomous work teams?

Table 1. Weight of the different industrial sectors.

NACE Code	Sector	% Plants
15, 16	Food, drink and tobacco	12.25
17-19	Textile industry, dressmaking, leather and footwear	12.71
20	Wood and cork	3.52
21-22	Paper, publishing and graphic arts	6.58
24	Chemical industry	7.19
25	Rubber and plastic materials	5.97
26	Non-metallic mineral products	6.12
27, 28	Metallurgy and mechanical product manufacturing	14.85
29	Machinery and metal equipment	7.50
30-33	Electric, electronic and optical supplies and equipment	7.04
34, 35	Transport supplies	10.10
36, 37	Various manufacturing industries	6.12

Table 2. Descriptive statistics for the variables (N=653)

	Mean	S.d.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. Internal promotion	2.70	1.21																	
2. Log (Size)	4.87	0.82	0.03																
3. State-owned	0.03	0.17	0.01	0.16***															
4. Multinational	0.24	0.43	-0.06*	0.29***	-0.08**														
5. Other Plants in Spain	1.76	2.97	0	0.22***	0.20***	0.06*													
6. Unions	2.53	1.22	-0.01	0.29***	0.09**	0.14***	0.04												
7. Recently founded	0.06	0.23	-0.02	0.02	0.03	0.01	0	0											
8. Degree of competition	0.41	0.49	0.10***	-0.05	-0.04	-0.07*	0.03	0.01	-0.03										
9. Log (Span of control)	2.60	0.54	-0.03	0.37***	0	0.15***	-0.01	0.15***	0.01	-0.03									
10. HPWP	2.02	1.24	0.05	0.20***	-0.03	0.28***	0.10***	0.07*	0.04	-0.02	0.05								
11. Log (Permanent contracts)	4.32	0.41	0.08**	0.04	0.08**	0.17***	0.02	0.10***	-0.03	-0.06*	-0.04	0.10***							
12. Technological change	2.67	1.15	0.07*	0.11***	0.05	0.11***	0.09**	0.04	-0.03	0.04	0.01	0.20***	-0.01						
13. Locational specificity	0.05	0.22	0.05	0	0.11***	-0.02	0.07*	-0.08**	0	-0.07**	-0.05	0.01	0.05	0					
14. Unobservable characteristics	0.28	0.45	0.10***	-0.01	-0.05	0.04	0.04	-0.09**	-0.04	0.06*	0.05	0.02	0.07*	-0.02	0.06				
15. Appraisal system	3.92	1.17	0.08**	-0.06*	-0.07*	0.03	0	-0.07*	0.01	0.06	0.01	0.05	-0.10***	0.01	0.02	0.02			
16. Incentives	0.66	0.47	0.02	0.09**	-0.04	-0.04	-0.04	0.11***	-0.11***	-0.01	0.11***	0.06	-0.04	0.07	-0.04	-0.03	0.06*		
17. Degree of supervision	3.33	0.66	-0.04	0	-0.06	-0.02	0	-0.07*	0.02	0.03	-0.01	0	-0.07*	0.11***	-0.04	0	0.17***	0.04	
18. Teamwork	17.11	28.6	-0.03	0.02	0	0.10***	0.04	0.06	-0.04	-0.03	-0.07*	0.14***	0	0.04	-0.03	0.01	-0.06	0.06	0

p<0.1. **p<0.05. ***p<0.01

Table 3. Results of ordered probit model estimations
(t-statistic in brackets)

	Model 1	**Model 2**	**Model 3**	**Model 4**
Constant	0.3878	1.2287***	1.7438***	-0.2575
	(0.869)	(8.290)	(7.834)	(-0.412)
Log (Permanent	0.2243**			0.2911***
Contracts)	(2.239)			(2.762)
Technological	0.0793**			0.0863**
Change	(2.167)			(2.257)
Locational Specificity	0.2994			0.2868
	(1.562)			(1.451)
Unobservable		0.2487***		0.2370**
Characteristics		(2.642)		(2.461)
Appraisal System		0.0727**		0.0877**
		(2.036)		(2.369)
Incentives			0.0600	0.0448
			(0.679)	(0.488)
Intensity of			-0.0572	-0.0977
Supervision			(-0.906)	(-1.495)
Teamwork			-0.0011	-0.0009
			(-0.775)	(-0.651)
Log (Size)				0.1040*
				(1.686)
State-owned				-0.1851
				(-0.726)
Multinational				-0.2975**
				(-2.728)
Other Plants in Spain				-0.0070
				(-0.467)
Unions				-0.0103
				(-0.280)
Recently Founded				-0.0158
				(-0.086)
Degree of				0.2434***
Competition				(2.788)
Log (Span of control)				-0.1013
				(-1.190)
HPWP				0.03014
				(0.820)
μ_1	0.7697***	0.7655***	0.7650***	0.7882***
	(15.533)	(15.475)	(15.503)	(15.618)
μ_2	1.1534***	1.1526***	1.1480***	1.1853***
	(24.060)	(24.066)	(24.061)	(24.317)
μ_3	2.0909***	2.091***	2.0764***	2.1519***
	(36.048)	(36.069)	(36.085)	(36.274)
Log L	-935.752	-936.196	-941.0295	-919.447
Chi-2	12.330***	11.441***	1.775	44.939***
N	653	653	653	653

* p<0.1, **p<0.05, ***p<0.01

Table 4. Results of the estimate including the manufacturing sector variables

	Coefficient (t-statistic)		**Coefficient (t-statistic)**
Constant	0.2637	*Food, drink and tobacco*	-0.4969**
	(0.041)		(-2.207)
Log (Size)	0.0999	*Textile industry, dressmaking, leather*	-0.2169
	(1.549)	*and footwear*	(-0.994)
State-owned	-0.2069	*Wood and cork*	-0.1675
	(-0.802)		(-0.578)
Multinational	-0.2155*	*Paper, publishing and graphic arts*	0.1421
	(-1.891)		(0.553)
Other Plants in Spain	-0.0038	*Chemical industry*	-0.6880***
	(-0.240)		(-2.755)
Unions	-0.0076	*Rubber and plastic materials*	-0.5078**
	(-0.204)		(-1.993)
Recently Founded	-0.0227	*Non-metallic mineral products*	-0.7629***
	(-0.122)		(-3.047)
Degree of	0.2706***	*Metallurgy and mechanical product*	-0.3176
Competition	(3.034)	*manufacturing*	(-1.496)
Log (span of control)	-0.1121	*Machinery and metal equipment*	-0.6432***
	(-1.280)		(-2.691)
HPWP	0.0359	*Electric, electronic and optical supplies*	-0.5219**
	(0.949)	*and equipment*	(-2.100)
Log (Permanent	0.3273***	*Transport supplies*	-0.3990*
Contracts)	(3.062)		(-1.705)
Technological	0.0816**		
Change	(2.101)		
Locational Specificity	0.2538		
	(1.246)		
Unobservable	0.2581***		
Characteristics	(2.631)		
Appraisal System	0.0885**		
	(2.359)		
Incentives	0.0283		
	(0.303)		
Intensity of	-0.1160*		
Supervision	(-1.745)		
Teamwork	-0.0001		
	(-0.065)		
μ_1	0.8070***		
	(15.746)		
μ_2	1.2112***		
	(24.508)		
μ_3	2.2006***		
	(36.411)		
Log L	-905.032		
Chi-2	73.769***		
N	653		

* p<0.1. **p<0.05. ***p<0.01

Figure 1. Summary of the theoretical proposed relationships

	Basic assumptions:	***Causes of the greater use of promotions:***	***Observable implications:***
HYPOTHESIS 1	Specific investments: Yes. Abilities: Observable. Effort: Observable.	**Specific investments** Positively related to:	-Distances from similar plants. -Technological change -Long term relationships
HYPOTHESIS 2	Specific investments: No. Abilities: Unobservable. Effort: Observable.	**Better information** Positively related to:	-Entry tests for unobserved abilities -Appraisal systems of worker performance
HYPOTHESIS 3	Specific investments: No. Abilities: Observable. Effort: Unobservable.	**Low incentives** Negatively related to:	-Degree of supervision -Teamwork -Other incentives