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SENIORITY-BASED PAY: IS IT USED AS A MOTIVATION DEVICE?

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Abstract: The purpose of this article is to explain what factors determine the use of seniority-based pay for production workers in Spanish manufacturing industry. The data used in order to achieve these objectives was taken from 774 Spanish industrial plants. The estimation of several ordered probit models enabled us to see that in firms where it was more costly for management to engage in opportunistic behaviour, deferred payment shows a negative relation to the use of devices, like monitoring or incentive payment, designed to align workers' objectives with those of the company.

Keywords: seniority-based pay, delayed payment, manual workers, Spanish manufacturing firm

JEL: J31, J33, M12

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1. INTRODUCTION

Numerous studies, both theoretical and empirical, have addressed the question of how workers earnings are related to seniority in the firm. While there is reasonable agreement as to the fact that such a link exists (Hashimoto and Raisian, 1985; Topel, 1991), the same cannot be said when it comes to determining the factors that explain why this should be so (Hutchens, 1989).

In this study an attempt will be made to explain why some firms establish some kind of association between workers' wages and their years of service in the organisation. The hypotheses to be tested are taken from Lazear's theory, which states that the reason for using deferred payment may involve issues related to the existence of an agency problem. Increasing earnings-seniority profiles do not come from increased productivity, as human capital theory holds, but are intended as motivators for employees to put more effort into their work.

This study takes predictions based on this theory and tests them against data relating to 774 Spanish industrial establishments. Undoubtedly one of the major strengths of this paper lies in the large size of the sample used and the fact that the data refer to firms rather than individuals. A further advantage arises from the number of variables used, which is large enough to permit a more thorough and detailed measurement of the main concepts to be addressed in the study. While most studies dealing with this issue focus on a single explanatory variable, here several will be taken into account simultaneously.

The findings of this article show that schemes linking wages to seniority are used in situations in which the firm would sustain substantial losses if it were to break the commitments made to the workers. This leads to the conclusion that rewards for seniority do not depend on increased productivity, but rather that productivity actually falls below wages in the last years of the employee's working life, contrary to what human capital theory forecasts. The results obtained also show that deferred payment is used as a motivator when the firm is such that it has a reputation to keep.

In the next section a review is made of the different theories that have been put forward to explain why there should be a correlation between seniority and wages, before concentrating on the theory that proposes that this correlation arises from the

presence of an agency problem. This will enable us to formulate a series of hypotheses concerning the variables that influence the application of a deferred wage scheme. Section three contains a description of the database that is used and an explanation of how the variables are measured. The main findings are presented in section four. The article ends with a few remarks on the principal conclusions to be drawn from this investigation.

2. THEORETICAL CONSIDERATIONS

2.1. Review of seniority-based pay theories

There is widely accepted empirical evidence to support the idea that workers who have spent longest working for the same firm earn more than others doing the same job, possessing the same experience in the labour market but who have not been with the same firm for so long (Hutchens, 1989). Many different explanations have been offered in order to explain this phenomenon.

For some authors, the fact that there is empirical evidence to show that a positive correlation exists between seniority and wages does not necessarily mean that an individual's earnings will increase in direct proportion to the length of time he has worked for the firm[1]. The relationship that emerges in cross-sectional studies may have more to do with the fact that better workers, those with the best jobs, and those best suited to their jobs earn more and therefore stay longer with the same firm. Therefore, certain workers in certain jobs would be on a higher salary from the beginning of the employment relationship, thereby increasing the likelihood of this becoming a lasting relationship. This, in turn, would favour the emergence in cross sectional studies of a positive correlation between salary and seniority.

There are various possible reasons why a worker should be paid more right from the start of the relationship (Abraham and Farber, 1987). Some employees, though it is impossible to tell which, may be less inclined to leave jobs, which, bearing in mind turnover costs, makes this type of worker more valuable to the firm than those who are more likely to leave. Furthermore, it is also reasonable to suppose that it will be the more

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[1] Abraham and Farber (1987) find empirical support for this claim. Altonji and Shakotko (1987) also report that the effect of seniority on wages is very slight, with experience having a much greater effect. Topel (1991), in contrast, finds a remarkable relationship to exist between seniority and wages.

productive workers who will be less likely to leave their jobs (Topel, 1991), making the correlation between seniority and wages even stronger.

The tendency in workers to stay longer with a firm may also be a result of the firm paying wages above market level. Efficiency wage models (Shapiro and Stiglitz, 1984) indicate that this type of wage policy may be especially useful in achieving discipline among workers and getting them to meet the firm's expectations. This is a means of encouraging workers to take more interest their work, and results in a higher degree of effort and longer employment relations.

Matching models (Jovanovic, 1979) also help to explain why cross-sectional studies reveal a positive relationship between wages and seniority, without this meaning that a worker necessarily stands to gain in any way from remaining with the same company over a long period of time. The most successful employer-worker matches will be, first, those that result in increased productivity, and next, those that endure for prolonged period of time. These two phenomena might be expected to occur in conjunction with one another. Worker-job mismatches, however, will result in decreased productivity and the worker leaving the company to look for another job where he will be more productive and where he will earn a higher wage.

The heterogeneity that exists between different people, different jobs and different combinations of the two, may, therefore, give rise to inconsistent and positively biased estimations of the effect of seniority on wages. Since seniority depends on the past decisions of individuals to leave jobs and companies' to dismiss workers, it will be positively correlated with the types of individuals and jobs that are least likely to end in dismissal or voluntary turnover. These same features are likely to correlate positively to worker productivity and, therefore, to wages.

The most widely recognised and accepted of all the theories that uphold the existence of a positive correlation between seniority and wages is without doubt human capital theory (Becker, 1964; Mincer, 1974). There are two different types of training companies may offer their employees: general and specific. If the training an employer provides for his employees is general, in other words, if it is useable in other jobs with other potential employers, this same employer will offer higher wages to more experienced workers, because these will be the ones with the highest productivity and therefore the highest market value. The rewards gained by an individual for his years of

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experience in the form of wage increments will grow in proportion to the amount of training he receives. Thus, the correlation between his job experience, which may have been gained in a single firm, and his wage will be an exact reproduction of the productivity-seniority profile.

Specific training, that is, valuable only in the company that provides it, generates quasi-rents to be shared between worker and employer. In a situation of this kind, a worker will refuse to accept a reduction in wages during the training period and will receive an increase in income once his training is complete. Though the relationship between productivity and seniority is positive, it will not be equal to the wages-seniority profile. The latter relationship will not be so steep, since the company must reap part of the benefit from its investment in the worker, in order for this investment to take place. When specific investment are made in the employment relationship, seniority provides a positive return for the worker, even controlling for his whole experience.

Human capital theory, therefore, predicts that wages will be linked to seniority in the company through productivity growth, which in turn will be conditioned by the amount of training of any kind offered by the firm to its workers. The growth of a worker's wage comes about as a result of growth in productivity[2]. However, the earnings-seniority profile will never be as steep as the productivity-seniority profile.

Self-selection models provide another explanation for the positive correlation between wages and seniority. Salop and Salop (1976) report that deferred wages may have the effect of a self-selecting mechanism among candidates for jobs in a company. Workers with a strong tendency to leave jobs will not be interested in being hired by firms that will begin by paying them below their productivity at the start of their careers to compensate them only at a later date. A deferred wage scheme, therefore, will attract only workers who intend to stay with the company for the whole of their professional career, with the positive impact that this has on organisational performance.

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[2] Brown (1989) finds empirical support for this idea. In periods when the worker receives most training, which is therefore when his productivity most increases, his wages also see their greatest increase. Another study that supports the explanation given by human capital theory is that of Hellerstein and Neumark (1995); here productivity and wage profiles are increasing and parallel. Medoff and Abraham (1980), in contrast, see no connection or, at the most, a negative one between workers' wages and scores in performance appraisal, which is what is used by them to measure productivity. Kotlikoff and Gohkale (1992) also report evidence to refute the human capital theory, since they find that productivity decreases with age and that workers are paid above their productivity in the final stage of their careers with the company, in compensation for having been paid below it when they were younger.

Harris and Holmstrom (1982), who work on the hypothesis that workers are more risk averse than firms, and look on job contracts as insurance mechanisms, also provide arguments to explain the effect of seniority on wages. If at the start of an employee's working life it is impossible to assess his productivity, a useful scheme might be to guarantee him a wage to match his expected productivity, minus a risk premium, regardless of the level of productivity he might eventually reach. The problem here arises when the true productivity level is revealed, since this could result in the most productive workers leaving the firm to look for another job where they will be paid according to their true worth. This danger can be averted by linking wages closely to seniority, which will encourage employees to remain in the company.

Workers may also prefer deferred wages if the rate of return on assets that the firm is able to achieve is higher than what the workers could attain on their own. From this point of view, firms would be investing part of the wages for the first few years the worker is with the firm, and then returning the interest to them in the form of deferred wages.

Loewenstein and Sicherman (1991) offer a further explanation for seniority-based wages. The positive correlation between wages and seniority may have to do with workers' preference for rising earnings-seniority profiles rather than decreasing or flat profiles[3].

2.2. Seniority-based pay as a motivation device

An alternative view to those presented above is that put forward by Lazear (1979, 1981), which approaches the problem from the point of view of worker motivation. Deferred wages schemes can be used to align the interests of the worker with those of the company.

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[3] These authors quote four reasons for this:
- Workers perceive a utility from a feeling of dominating their environment, which is connected to the wages they earn.
- Some people may anticipate the need to meet growing future expenses and find it difficult to control their expenses in the early years.
- This utility may depend not only on absolute consumption levels, but also on the rate at which these grow (Frank and Hutchens, 1993).
- Finally, utility in the present could be gained from being able to anticipate future consumption.

When a worker enters into an employment relationship, he is concerned about the present value of the stream of wages he will receive throughout the relationship[4]. The firm's concern, meanwhile, is that the present value of worker's productivity throughout his career is maximum (Lazear, 1979). Leaving all other considerations aside, it should make no difference to a worker whether he receives the same wage all his working life or if he is paid less at the beginning and more towards the end, as long as the present value of the sum of all these wages is the same.

However, the way in which the wage is distributed over time may have an effect on the gains generated in the working relationship. By keeping back wages to be paid at the end of the employee's career, the firm discourages him from engaging in inappropriate behaviour, and therefore increases both the value the employee can be expected to contribute to the firm and also the total amount of wages that this worker receives throughout the duration of his career in the firm.

In a delayed wage scheme, workers are paid below their productivity in the first years of their contract, while their wage is above their productivity in the final stage of their careers with the firm. If workers do not shirk, they will be allowed to stay with the firm and will be able to recuperate their initial losses. If, however, they shirk, they run the risk of being caught and dismissed and therefore of losing the chance to recover the wages due to them in the last years of their contract (Hutchens, 1987). This scheme works in such a way as to increase the utility for workers, since it increases their productivity during the period in which they are employed and, thereby, the amount of wages they receive.

In contrast to the indications of human capital theory, Lazear's theory claims that wages increase with seniority even when productivity fails to do so. The longest serving workers receive higher wages not because they are more productive but because this is the best way to motivate both them and their younger co-workers (Lazear, 1981). From the point of view of motivating employees, therefore, there should be a steeper association between wages and seniority than between productivity and seniority. This

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[4] The findings of Loewenstein and Sicherman (1991) cast doubt on this assumption.

goes against the proposals of human capital theory, which states that wage growth will always be on a par with or below that of productivity[5].

2.3. Explanatory factors of seniority-based pay

If the linking of wages to seniority is to be seen as a means of motivating workers, it will be used in circumstances where there is an agency problem. A situation in which there is no problem of this kind is when workers are self-employed, that is, when they are the owners of the firm in which they work. If it is correct to assume that deferred payment acts as a motivator to workers, the wage-seniority slopes to be found in self-owned companies ought to be less pronounced than in other types of firms. Lazear and Moore (1984) find empirical evidence to support this argument, since the present value of the lifetime income earned by an employee increases less with the slope of the age-earnings profile in the case of self-employed workers. These findings would confirm seniority-related pay as a way of aligning the interests of the worker with those of the company.

Hypothesis 1: Seniority-based pay will be less used when the firm is owned by the workers

Agency problems are unfailingly found to occur where job monitoring proves difficult. Therefore, the more difficult a job is to supervise and the less the resources devoted by the firm to the surveillance of workers, the more likely it is that the firm relies on deferred payment. Empirical evidence contributed by Hutchens (1987) shows that monitoring difficulties correlate positively to the application of deferred payment schemes; among older workers, jobs consisting of repetitive tasks, and therefore requiring less supervision, tend to be less well-paid.

Hypothesis 2: Seniority-based pay will be more used when there are difficulties in monitoring the workers

Deferred payment should tend to be used more when no other mechanism has been put in place to align workers' interests with those of the company. Performance related pay schemes, for instance, can act as a substitute for deferred payment, which becomes

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[5] Carmichael (1983), however, reconciles human capital theory with the fact that wage-seniority profile slopes should be more pronounced than those of the productivity-seniority profile. This author claims that when a job requires specific training, it may prove efficient for a firm to pay its more long-standing workers a wage that is above their marginal productivity.

unnecessary when workers are aware that their compensation depends directly and positively on the degree of effort they are prepared to put into the job (Lazear, 1979). Barth (1997), working with a sample of Norwegian workers, reports that workers being paid on a piece work basis have nothing to gain in wage terms from staying with the same company over a long period. This provides further confirmation of seniority-based pay as a means of motivating workers.

> *Hypothesis 3: Seniority-based pay will be less used when performance-related pay is being put into practice*

There is little sense in linking wages to seniority unless the working relationship is destined to last. If the expected duration is a matter of days or weeks, deferred payment schemes become devoid of any purpose (Lazear, 1979). The actual duration depends on two factors. The first of these is the likelihood of the company remaining in business. If the firm is in danger of going out of business, either on account of poor management or because it is functioning in a volatile or unstable environment, workers will obviously not be willing to accept a scheme by which they are paid less in their first years with the company, being promised to recuperate this loss in the final stage of their career with the firm. The second factor has to do with how long the worker himself is likely to stay with the firm. Deferred payment is only worth applying when the employment relationship begins with a more or less formal commitment on both sides that is likely to last for a more or less indefinite period.

> *Hypothesis 4: Seniority-based pay will be more used when there is a high probability of the firm remaining in the business*

> *Hypothesis 5: Seniority-based pay will be more used when there are prospects of a long-term employment relationship*

The practice of linking payment to seniority may also depend on the strength of union presence (Lazear, 1981). Since union relationship with the company will generally be longer than that of any individual worker, they can act as intermediaries between the company and the workers in ensuring that the latter fulfil their obligations. If they fail to do so, the union will pay the penalty when the time comes for the next collective bargaining process. In this case the disciplinary role of the unions would make it unnecessary to reward seniority. However, it is also reasonable to suppose that the

unions may act as guarantors to ensure that the company does not breach the agreement by dismissing workers. This would involve making the promise of the company not to dismiss workers as long as they do not shirk trustworthy, thereby increasing the viability of a deferred payment scheme. Union influence may also affect the duration of the job contract. If the unions promote the use of permanent employment contracts, they will be accompanied by more widespread application of seniority pay schemes (Lazear, 1979).

Hypothesis 6: Seniority-based pay will be less/more used when unions are strong

The theory that suggests deferred payment as a motivator, like other theories that have been quoted[6], depends on the firm having nothing to gain from breaking its promise to pay its older workers above their productivity. Some means is, therefore, needed to prevent opportunistic practices on the part of the firm such as breaking its implicit promise to the workers. These need to be able to believe the firm's promise to pay them lower wages at the beginning of their careers in order to compensate them in their final years. There is no doubt that the firm's reputation, on which its future performance rests[7], will oblige it to fulfil its commitments with the workers when the time comes (Medoff and Abraham, 1980; Carmichael, 1989). The greater the potential loss of reputation for breaking its implicit promise to the workers, the safer it is to predict that the firm will honour its commitments.

Three factors can be seen to determine the degree of trust workers have in the firm not to engage in opportunism but to honour its promises. The first is the age of the organisation. When a firm has been in business for a relatively long period of time, there has been ample opportunity to see what kind of behaviour it has displayed in its relationships with other agents. If, over the course of its history, the firm has always endeavoured to keep its side of any bargain, it can be expected to continue to do so in the future, since otherwise it stands to lose not only a reputation it has taken years to build up, but also the benefit of the trust of other agents in its intention to act honourably. Seniority-based pay may, therefore, be expected to be more widespread in firms that have been less recently founded.

Hypothesis 7: Seniority-based pay will be more used in old firms

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[6] Such as the one that sees job contracts as insurance contracts.
[7] If, for example, a company has a poor reputation, it will have to pay more in order to attract new workers (Carmichael, 1989).

The second factor has to do with whether or not the government forms part of the ownership structure of the firm. Given the type of objectives that are usually present in firms where government ownership is involved, together with the greater opportunity that exists in this case for workers to resort to retaliatory action against the owners of the firm, compared to what would happen in a privately owned company, workers can be assumed to have more trust in a public firm to fulfil its promises. This leads us to predict a higher incidence of deferred wage schemes in public companies.

Hypothesis 8: Seniority-based pay will be more used in government-owned firms

The third feature of the firm that influences the amount of losses involved in a loss of reputation is its size. In the event of a breach of agreement with the workers, a large firms runs a greater risk of the incident attracting publicity and also, of this negative publicity having more widespread repercussions (e.g. due to more frequent hiring), which increases the losses the firm would suffer for having dismissed its workers. This, together with more serious supervision problems and the lesser likelihood of closure, which is the case in large firms, leads us to suspect that these will be where most use will be made of deferred payment.

Hypothesis 9: Seniority-based pay will be more used in large firms

3. DATA AND METHODOLOGY

3.1. Data collection

The data used in this article, referred to 1996, come from a research project whose scope was Spanish manufacturing industry. The concept of manufacturing industry is clearly defined in the National Classification of Economic Activity (NACE), which includes all the manufacturing industries (from code 15 to code 37) with the exception of oil refining and the treatment of nuclear fuel (code 23).

Fixing the unit of analysis was an important matter to settle. Two possibilities were initially open to us: to choose the company or the plant as the organisation to be considered under study. We opted for the latter. In the industrial sector, the plant constitutes the business unit that is of strategic importance for the implementation of the practices that make up our study. These practices are adopted in the plant, and therefore, it is at this level where problems arise and where the results must be analysed. Moreover, the answers to the different questions raised are expected to be more reliable when taken

from the plant; since the knowledge of these issues is greater even if only because of greater proximity.

Another aspect of the field of application to determine was the size of the plants. The industrial plants included in our sample employ fifty or more workers. This limit serves to cover a wide spectrum of the population employed in Spanish industry, what is more it simplifies the fieldwork. With these criteria the reference population was formed by 6013 units, a thousand units being the aim of the sample, these were stratified according to sector and size.

In order to carry out the investigation a questionnaire was made up and after the corresponding pre-test, it was modified in different ways to form the final questionnaire. The questions concerning human resource management refer to blue-collar workers. The fact that we refer to a specific group of workers creates problems, as far as the generalisation of the results to other professions is concerned. However, limiting the occupation under study means that it is easier to compare the different units we have studied, as within the company there are possibly several internal labour markets with substantial differences between them.

It was considered that the best method of gathering the information was through personal interviews, as it guarantees the highest response rate. As we had foreseen at the beginning of the study, most of the interviews (more than three-quarters of them) were made to either the plant manager of the production manager. The questionnaire was meant to be answered by a person with a broad understanding of the organisational aspects of the plant as well as, though to a lesser degree, the technical ones. Nevertheless, the questionnaire's complexity did not mean it could not be understood by any of the plant managers with knowledge of the areas under study. After making 3246 telephone calls to make the necessary appointments, 965 valid interviews were undertaken. This number represents a response rate of 29,72 percent and constitutes the initial sample about which we have information. In this article, because of the existence of missing values, we will use the information from 774 factories.

3.2. Measures

As measure of the use of delayed payment and, therefore, as our dependent variable, we will use SENIORITYPAY. The questionnaire included a question that asked

the respondents to rank the two most important criteria considered at determining guaranteed wages for manual workers in the plant. They had to choose among the following options: type of job, qualifications (level of knowledge), seniority, performance and supervisors' assessment. When seniority was mentioned in first place, SENIORITYPAY takes the value two; when it was mentioned in second place, it takes the value one, being zero in the rest of cases.

The dichotomous variable WORKEROWNED captures whether or not employees own the factory. MONITORING indicates the effort the employer makes at supervising employees. This variable measures on a scale of one to five the degree of control under which manual workers in the plant perform their duties. The existence of other motivation devices different from seniority-based pay is captured by INCENTIVES. This dummy variable takes value one when some kind of incentive payment, such as production, quality, plant-level or firm incentives, is used for blue-collar workers.

The expectation of the plant keeping on working and not being forced to close down is assessed through the instability and variability existing in the environment where it operates. PREDICTABILITY measures on a scale of one to five the degree to which the demand of the products manufactured by the firm is predictable. A high value of PREDICTABILITY would involve a low risk situation and, therefore, a greater probability of the firm maintaining its activities and a lower one of the plant being closed.

The probability that the employment relationship continues in the long-term depends on the characteristics of the contract between the employer and the employee. A permanent job contract, although not completely, involves the expectation that the employment relationship will persist for a long time in the future, until worker's retirement. However, if the contract is a fixed-term one, we should not expect a long-term relationship and this would make not feasible the existence of seniority-based pay. TEMPORARY indicates the percentage of manual workers under a fixed-term contract. UNIONS measures on a scale of one to five the degree of influence unions have over the workers in the factory.

OLD is a dummy variable that equals one when the factory was founded in year 1980 or before. The dichotomous variable PUBLIC indicates whether or not the plant is partly or totally owned by the government. LARGE was coded one if the number of employees of the plant is at least five hundred. Not only plant size, but also firm size can

be very important for the study of the determinants of use of delayed payment contracts. A proxy variable for firm size is the number of establishments the company operates in Spain. FIRMSIZE equals one when this number, excluding the analysed plant, is greater than five. Finally, we will define REPUTATION as the sum of variables LARGE, PUBLIC, OLD and FIRMSIZE.

Table 1 displays the means and standard deviations of the variables for the sample we use in this article and the means of the independent variables for the three groups defined by the dependent variable. We can see that the mean of SENIORITYPAY is 0,38[8]. This implies that the number of years employees have been working in a plant is not a very important criterion in determining their wages. We can also see that the average factory in our sample is of small size, was founded before 1981, is not owned by the government or by the employees, and is not part of a firm with more than five establishments in Spain. We should also underline the fact that the surveyed factories state that the degree of predictability of their demand is medium and that unions influence is positioned between medium and low. Regarding other variables related to work organisation and human resource management, we could emphasise that, in general, workers are quite closely monitored, that in two thirds of the cases manual workers receive some kind of incentive payment and that the percentage of temporary workers is slightly greater than twenty.

<div align="center">**INSERT TABLE 1**</div>

3.3. Empirical model

Since our dependent variable SENIORITYPAY takes ordered discrete values, we will estimate ordered probit models (Maddala, 1983). These models assume that there is a non-observed underlying response variable Y defined by a regression relationship.

$$Y = X\boldsymbol{b} + u \tag{1}$$

X is the set of explanatory variables and u is the random term, which is normally distributed. In our case what we observe is that

$$\text{SENIORITYPAY} = 0 \text{ if } Y \leq 0$$

$$\text{SENIORITYPAY} = 1 \text{ if } 0 < Y \leq \mu \tag{2}$$

SENIORITYPAY=2 if μ<Y

4. RESULTS

Table 2 contains the results obtained from two ordered probit models. The difference between the two lies in the fact that, while the first includes as explanatory variables FIRMSIZE, PUBLIC, OLD and LARGE, the second uses REPUTATION. It can be immediately appreciated that both are significant and an important number of variables have coefficients that are significantly different from zero.

The coefficient for the variable WORKEROWNED, however, is not significantly different to zero, which indicates that the fact that the workers own the plant in no way affects the likelihood of the firm adopting a deferred payment scheme. A result of this kind would not be expected to emerge if linking pay to seniority were a means of motivating workers, if this were the case, the variable WORKEROWNED would have a negative coefficient, since in cooperatives there is less need to set up ways of motivating workers, since workers in these contexts act at once as agents and principals. The INCENTIVES and MONITORING variables also fail to register significance in either of the models.

The PREDICTABILITY variable in no way affects SENIORITYPAY. Rather than rejecting the hypothesis that the firm's likelihood of continuing in business has a positive effect on the adoption of deferred payment schemes; this result may be due to the fact that the variable used does not provide a precise enough measure of the concept to be assessed.

What does affect the value of the dependent variable is the type of contract the firm's employees are working under. In line with the theory defended in this study, the presence in the workforce of a large number of workers on temporary contracts acts against the likelihood of there being a deferred payment scheme in place. This, therefore, confirms the theory that this type of wage scheme requires that rather than being merely a temporary arrangement, the working relationship should have some prospect of long-term duration.

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[8] In 72 plants (9,30 % of the valid sample) seniority was the most important criterion at determining wage levels and in 150 (19,37%) it was the second most important one.

The variable used to capture union influence fails to have a statistically significant coefficient in either of the two models that were estimated. This may be due to conflicting reasons for the role they perform in the decision to link pay to seniority.

The second model shows clear evidence of the fact that deferred payment schemes are more likely to be introduced in firms of the type that have a reputation to keep. Signs of this particular effect are also to be seen in the first model for some of the characteristics of the plant or the firm. Consequently these findings enable us to report that increased productivity is not the reason why wage increments are based on a worker's length of service with the company, since, if this were the case, the company's reputation should play no part in accounting for the incidence of deferred payment schemes.

It can be seen from Table 2 that in more recently established firms, those founded since 1980, it is less common to see wages linked to seniority. This supports what was initially assumed in this study, namely, that the older the plant the more likely it is to have introduced a deferred payment scheme. An organisation with a certain history behind it has had the opportunity to build up a reputation, this in turn makes it easier for workers to trust the company to honour its commitments, a condition which is essential if a wage practise of this nature is to be set up.

INSERT TABLE 2

Contrary to initial predictions, however, the presence of public capital in the ownership structure of the firm does not appear to favour the introduction of deferred payment schemes. Nevertheless, the limited statistical significance of the coefficient for the PUBLIC variable means that there appears to be no evidence to link entirely private ownership of a company to a higher incidence of delayed payment.

Finally let us turn to the results obtained with respect to size, both of the plant and the company. In the case of the plant there is no sign of a higher incidence of deferred payment in plants employing larger numbers of workers. On the other hand, the direction of the FIRMSIZE coefficient is as predicted. Plants belonging to companies with a minimum number of plants throughout the rest of Spain are more likely to have introduced a deferred payment scheme. The greater the risk of publicity and loss of

reputation from possible behaviour on the part of the company, the more it will tend to have installed deferred payment schemes.

Results obtained so far do not appear to support the theory that a deferred wage scheme is something that is introduced with a view to addressing possible agency problems between an employer and his employees. What is needed, however, is an analysis of what happens when the sample is split according to the REPUTATION and WORKEROWNED variables. If deferred payment worked as a motivator there should not emerge any effect of the MONITORING and INCENTIVES variables in plants that are owned by the workers. Nor should there be any effect of this kind in firms that cannot be trusted to keep to their agreements, since such a lack of trust would seriously hinder the introduction of a deferred payment system[9]. On the other hand, plants that can be trusted to refrain from opportunistic behaviour fulfil the conditions that enable them to use deferred payment as a means of solving the agency problem.

Table 3 shows the results of the estimation for the three groups of plants into which the sample was split. Only in the case of factories with a REPUTATION index of at least two, does the model prove statistically significant. It can be seen that in this group the MONITORING and INCENTIVES variables are statistically significant in the direction anticipated. Deferred payment is less widespread in plants where workers are more strictly controlled by management and in those where no variable wage schemes have been set up. These results, therefore, confirm the theory that the linking of workers' wages to the number of years they have served in the organisation is used as a way of disciplining employees to work in such a way as to pursue not merely their own objectives but those of the firm as whole.

INSERT TABLE 3

5. CONCLUSIONS

This study takes a sample of 774 industrial plants with fifty or more employees and examines the factors that determine the use of seniority as a criterion by which to fix the total amount of wages to be paid to production workers. After beginning with a brief review of the different theories that have been put forward to explain the reasons for applying deferred payment, the main focus is placed on the theory that claims that this

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[9] These plants are defined as having a REPUTATION value of one or zero.

type of wage practise can be used to gain a positive behaviour from workers. This approach is used to establish a series of variables that may affect the diffusion of deferred payment in workers' pay packages.

The empirical analysis reveals a series of variables that prove significant in accounting for the incidence of payment based on tenure. It is discovered, for example, that temporary employment is associated with a low value on the dependent variable. The application of seniority-based pay schemes is also found to be related to certain characteristics, either in the plant or the company of which it forms part, that would have the effect of adding to the gravity of the loss of reputation that would be sustained by the company should it engage in opportunistic behaviour. More recently established plants belonging to companies with fewer than five other plants in Spain make less use of the deferred payment system.

Our findings suggest a series of qualifying remarks that could be made regarding the validity of the different theories used to explain the use of deferred payment. Bearing in mind the significance of the coefficients for the explanatory variables used, it appears reasonably clear that the type of wage payment being analysed here is introduced in situations where a series of mechanisms is in place to ensure that firms will not resort to opportunistic practices. This logically leads to the assumption that there would be some immediate gain for the company if it were to break its commitment with the workers. Hence it can be deduced that the wage a company pays its workers in the last years of their career is in excess of the contribution they make to the company. These findings, therefore, refute the human capital theory and other theories that state that rewards for long service are based on increased productivity while they endorse theories that claim the relationship between wages and seniority to be steeper than that between productivity and seniority.

These results provide substantial support for the theory that states that pay for seniority is used as means to motivate workers. Deferred payment is used most often in plants where workers are under less supervision and where there is no incentive pay system. These relationships, however, exist only in plants where the organisation has a reputation to keep. If deferred payment is to be introduced, therefore, it is first of all necessary that workers receive an implicit guarantee that the company will not resort to opportunism by laying them off once they reach the final stage of their careers.

Although the size of the sample that was used, and the number of explanatory variables included were enough to guarantee the validity of these findings, this paper must not conclude without acknowledgement of the obvious fact that it has its limitations. There is reason to believe that these arise mainly from the precision with which some of the variables measure the theoretical concepts they were used to capture.

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Table 1.

Means and standard deviations of variables. Means of the independent variables for the groups defined by the dependent variable

Variable	Mean	Std. dev.	Mean for SENIORITY PAY=0	Mean for SENIORITY PAY=1	Mean for SENIORITY PAY=2
SENIORITYPAY	0,38	0,65	-	-	-
WORKEROWNED	0,05	0,23	0,06	0,04	0,02
MONITORING	3,35	0,70	3,36	3,34	3,29
INCENTIVES	0,66	0,48	0,66	0,63	0,65
TEMPORARY	21,15	21,35	22,79	15,94	19,37
PREDICTABILITY	2,98	0,92	2,98	2,95	3,07
UNIONS	2,55	1,24	2,54	2,63	2,47
LARGE	0,10	0,30	0,08	0,17	0,08
OLD	0,75	0,43	0,72	0,84	0,79
PUBLIC	0,03	0,18	0,02	0,05	0,03
FIRMSIZE	0,08	0,28	0,07	0,13	0,14
REPUTATION	0,98	0,69	0,91	1,19	1,06
N	774	774	552	150	72

Table 2

Determinants of seniority-based pay. Ordered probit models

Variables	Coefficient	t-statistic	Coefficient	t-statistic
Constant	-0,4259	-1,3659	-0,4071	-1,3731
WORKEROWNED	-0,3503	-1,5287	-0,3545	-1,5528
MONITORING	-0,0333	-0,5359	-0,0312	-0,5021
INCENTIVES	-0,0498	-0,4993	-0,0522	-0,5291
TEMPORARY	-0,0054**	-2,2940	-0,0054**	-2,3937
PREDICTABILITY	-0,0056	-0,1085	-0,0084	-0,1671
UNIONS	-0,0313	-0,8194	-0,0352	-0,9408
LARGE	0,1698	0,9752		
OLD	0,2292**	2,0231		
PUBLIC	0,1192	0,3849		
FIRMSIZE	0,3206*	1,9320		
REPUTATION			0,2224***	3,1376
μ	0,7755***	13,4347	0,7748***	13,4962
N	774		774	
Chi-squared	23,57***		22,94***	
Log L	-591,93		-592,25	

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

Table 3

Determinants of seniority-based pay (ordered probit models).

Sample split by REPUTATION and WORKEROWNED

Variables	WORKEROWNED=0				WORKEROWNED=1	
	REPUTATION≥2		REPUTATION<2			
	Coef.	t-st.	Coef.	t-st.	Coef.	t-st.
Constant	1,1003	1,4820	-0,2626	-0,8000	-0,7722	-0,2721
MONITORING	-0,4041**	-1,9991	-0,0182	-0,2621	0,2353	0,4385
INCENTIVES	-0,6604**	-2,3531	0,1006	0,8881	-0,9701	-1,2471
TEMPORARY	-0,0004	-0,0866	-0,0070**	-2,5290	-0,0261	-0,9960
PREDICTABILITY	0,0103	0,0790	-0,0195	-0,3413	-0,0656	-0,1617
UNIONS	0,1466	1,4735	-0,0660	-1,5287	0,1053	0,2754
μ	1,2003***	6,6518	0,6966***	11,2684	0,9114**	2,1602
Chi-squared	11,55**		9,14		7,55	
Log L	-95,98		-463,67		-21,37	
N	111		620		43	

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

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