Seniority Profiles in Unionised Workplaces: Do Unions Still Have the Edge?

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Abstract

In this paper, the author explores how institutional arrangements influence employees' wages. Particularly, the focus of this study is to distinguish the different paths seniority-earnings profiles follow depending on whether the individual is employed in a workplace where trade unions and collective bargaining are present and/or where formal wage scale rules are adopted. The findings suggest some quite interesting patterns. Overall, it appears that senior workers, compared to their junior colleagues, are better off when covered by formal incremental scales, since seniority wage profiles are estimated to be steeper in these jobs. Furthermore, as the results imply, formal wage rules are more likely to be adopted in workplaces with union representation. Nevertheless, there are indications that seniority plays a significant role even in union jobs with no such scales rules. One possible explanation may be that unwritten policies, which actually serve the same purposes as formal rules, are quite likely to be adopted in these union jobs. Occupational expertise, on the other hand, is highly rewarded in less restricted or structured environments, where individual productivity can be measured. The analysis implies that in jobs with no formal incremental scales, and especially in the non-union sector, employees' wages are determined by their competitive accumulated occupation-specific skills, rather than their seniority. In conclusion, workplaces with union representation and seniority-earnings policies "favour and protect" their senior employees, while the more competitive non-union sector jobs are fairer in the sense that they reward workers based on their true qualifications and output productivity.

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1   Introduction

Numerous studies in the literature have examined the significance of seniority on the wage determination process. Job tenure, either due to unobserved individual and job-match characteristics reflected in the duration of the job match (Abraham and Farber 1987; Altonji and Shakotko 1987) or due to the acquisition of firm-specific human capital (Topel 1991), appears to have a positive impact on earnings. The purpose of this paper is to extend this knowledge and explore whether there is any interaction between institutional arrangements and workplace policies on individuals' earnings profiles, giving a particular attention to seniority. More specifically, the author wishes to examine whether there are different seniority-earnings paths when a trade union is present or when formal wage incremental policies exist in the workplace. The innovation of this paper is that it is based on a more detailed description of the different, accumulated in-work kinds of skills that basically decompose acquired human capital beyond the conventional practice of dividing skills between firm-specific and general labour market skills. Furthermore, here we use British panel data covering the last decade of the twentieth century, a period of time well after the hostile legislation towards unionism (end of 1970s) and just before the introduction of a national minimum wage (April 1999). We believe it is of great interest to examine the role of unions and their effect on earnings in the modern British labour market and to explore how trade unions adjusted to this new era.

The British labour market since the late 1970s has experienced many significant changes concerning employees' representation in the workplace. Restrictive legislation and less friendly managerial attitudes towards trade unions among other developments led to the weakening of unionism through the derecognition of such

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workers' associations in existing establishments, the creation of new workplaces where trade unions were not particularly popular, or supported and the decline in union membership. Consequently, the proportion of the workforce covered by collective bargaining shrunk and, in line with the decline in membership strength, union influence over pay setting has waned even where the institution continues to exist. Union membership declined by over 5 million in the two decades after the 1979 zenith of 13 million. In addition the proportion of workers covered by a collective agreement fell from 71 per cent in 1984 to 51 percent in 1990 and to 35 per cent in 1997. The wage premium that individuals covered by collective contracts traditionally used to enjoy over the workers who were not covered has effectively evaporated by the end of the 1990s. For men the wage premium fell from 9 per cent in 1991 to zero in 1999, while for women, it fell from 16 per cent to 10 per cent over the eight years (Machin, 2002). Although, trade unions in nowadays appear to be less able to extract concessions from employers and the union wage premium may be nearly extinct, still workers' unions and collective contracts continue to be strongly associated with lower levels of earnings inequality than the non-union sector (Metcalf *et al.*, 2001).

Despite the fact that the impact of trade unions on economic performance has been restricted in recent years, unions still wield '*the sword of justice*' in the workplace. It is a stylised fact that pay dispersion among unionised workers is lower than the spread among their non-union counterparts. Trade unions even now sustain their traditional role as defenders of egalitarian pay structures in the organised sector (Machin, 1997). This is achieved through three avenues identified in the literature: (a) within establishments (b) across workplaces and firms and (c) across the whole pay distribution. Unions reduce wage dispersion within establishments via two operational rules. First, they prefer a single wage rate for each occupational group whereas in workplaces with no representation and collective contracts supervisors decide pay levels within a range. Second, unionised workplaces make more use of objective criteria, like seniority, in setting pay rather than subjective factors, like individual merit, preferred in non-union establishments. Union representatives prefer reduced pay differentials within an establishment for three main reasons:

1. They are concerned about favouritism and discrimination in the workplace, therefore they opt for impartial objective standards where pay goes with the job.
2. In a median voter framework of union representation, since median pay is less than mean pay in nearly all firms, we should expect that over half of the employees will favour redistribution towards the lower paid.

3. Workers' solidarity is likely to strengthen when they receive similar wage rates.

The pursuit of wage standardisation by trade unions narrows pay dispersion within the organised sector as well. Two arguments that provide reasoning for this phenomenon (Freeman and Medoff, 1984) are that, first of all, employers and workers of firms competing in the same market can be expected to favour a standard rate. On the one hand, an employer does not want a labour contract that is more expensive than its competitors. And on the other hand, it secures workers' pay from any undercutting, since essentially it takes wages out of competition. Furthermore, union solidarity may be at stake if some workers are paid notably more than others for the same job. The decentralisation of bargaining from national multi-employer agreements to firm or workplace agreements, especially in the private sector, and the privitisation during the last two decades (British Petroleum, British Aerospace, British Telecom, gas water, electricity and the railways) may have increased the dispersion of pay in the organised sector. Nevertheless, continuing union recognition should prevent pay dispersion widening to the extent that we observe in the non-unionised sector. Finally, trade unions reduce inequality across the whole pay distribution by the enforcement of a *de facto* wage floor for covered jobs, i.e. by truncating the bottom tail of their pay distribution. The introduction though of a national minimum wage (NMW) legislation (April 1999) may undermine collective bargaining where it exists and effectively reduce the role of trade unions in the future[1].

Trade unions are traditionally associated with the standardisation of pay setting mechanisms, often in the form of seniority pay scales. Seniority can be considered a mechanism that unions adopt in order to enforce non-arbitrary procedures for pay and promotion and so any pay differentials arising out of seniority based systems are compatible with union goals. Freeman and Medoff (1984) underline the importance of seniority in the operation of a unionised workplace. According to the authors, "*union seniority clauses protect older union workers from the danger of layoffs and give them greater chances of promotion compared with otherwise similar older nonunion workers*" (pp. 135). A theory that provides an insight into how seniority is directly linked to wages in a union firm is the '*discriminating monopoly*' approach that describes a non-uniform pricing model of union wages (Frank 1985;

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[1] The data set used here covers the period between 1991 and 1998, where there was no statutory minimum wage protection, so the NMW does not invalidate any of our arguments.

Kuhn 1988; Kuhn and Robert 1989; Frank and Malcomson 1994). This model is similar to the multi-part tariff in product markets, where a product market monopolist is able to discriminate among consumers by applying a non-uniform price schedule that yields higher profits than otherwise. The discriminating monopoly theory implies that a seniority wage scale, usually accompanied by a *'last-in, first-out'* (LIFO) layoff rule, is adopted in the workplace.

Under this framework, workers are positioned according to their job tenure in a queue, a seniority rank, based on which they are hired and laid off. Therefore, the firm is bound to first employ the senior workers offering them a higher wage rate, before it can employ junior workers at their reservation wage. From the unions' point of view, irrespectively to what their preferences might be, concerning the distribution of rents among its members, a seniority wage scale can achieve greater employment efficiency and consequently more rents extracted from the firm (Kuhn 1988, Kuhn and Robert 1989). Firms, on the other hand, are likely to adopt such a policy for a variety of reasons. Based on a seniority wage scale policy, as outlined above, the marginal employment decision from the employers' perspective involves the low-wage junior workers who are employed only if their lifetime marginal product exceeds their lifetime income stream, both discounted at present value. Hence, as Booth and Frank (1996) claim, it is more profitable for the firm to hire at the bottom of a steep scale than the average wage on the scale would suggest. Furthermore, hiring costs are likely to exist and workers already employed may also have acquired firm-specific skills, i.e. outsiders are not perfect substitutes for insiders. Firms will attempt to discourage labour turnover among their most highly valued workers by implementing a seniority wage rule that under these circumstances appears to be an optimal policy. The adoption by firms of policies linking wages and tenure, of course, goes back to the 1970's, as it is a central element of the descriptive theory of internal labour markets (ILMs).

The concept of the ILM began with the seminal work of Doeringer and Piore (1971), who define the institution as *"an administrative unit within which the pricing and allocation of labour is governed by a set of rules and procedures"* (pp. 1). The reasons for the existence of such institutions lie in the characteristics of joint production and the problems of monitoring and consistent incentives. ILMs develop to deal with these problems in the face of specificity in human capital investments, and opportunistic behaviour in the context of information asymmetries.

The primary rationale for ILMs is usually supposed to be specific investment (Wachter and Wright, 1990). Skill specificity is measured by the skill's uniqueness to the job classification and the enterprise and is accumulated through on-the-job training. This kind of training occurs by *'osmosis'* in the production process (Doeringer and Piore, 1971), where the participants assume dual duties of learning and carrying out the tasks and *"is confined to those skills required for the job and no excess training"* (pp. 27). However, for the worker, increasing skill specificity *"reduces the incentive for him to invest in such training, while simultaneously increasing the incentive for the employer to make the investment"* (pp. 14), since the skills cannot be readily utilised elsewhere.

The four distinguishing features of ILMs, as summarised by Doeringer and Piore, are:
1. Entry to internal labour markets is via certain jobs and ports of entry.
2. Rules regarding job security, career arrangements and so on differentiate the insiders from the outsiders to the firms.
3. Employees are paid according to administrative rules and customs, so in a way wages are tied to jobs rather than to individuals. And,
4. Wages are influenced only weakly by conditions in the labor market external to the firm.

A cornerstone of the Doeringer and Piore characterisation of ILMs is the notion that wages are attached to jobs and to a lesser extent to individuals and their human capital. Thereby the firm commits itself to a reward structure, which relies on promotions. Access to higher level positions on internal promotion ladders is not open to all comers on an unrestricted basis. As part of the internal incentive system, higher level positions are filled by promotion from within whenever this is feasible. This practice, especially if it is adopted by other enterprises to which the worker might otherwise turn for upgrading opportunities, ties the interests of the worker to the firm in a continuing way. Given these ties the worker looks to internal promotion as the principal means of improving his position. Reliance on internal promotion has affirmative incentive properties in that workers can anticipate that differential talent and degree of cooperativeness will be rewarded. Consequently, although the attachment of wages to jobs rather than to individuals may result in an imperfect correspondence between wages and marginal productivity at parts of entry, productivity differentials will be recognised over time and a more perfect correspondence can be expected for higher level assignments in the internal labour

market job hierarchy. Thus internal promotion ladders encourage a positive worker attitude towards on-the-job training and enable the firm to reward cooperative behaviour.

ILMs, therefore, consist of sets of careers and relatively detailed defined career paths that in turn lead to long-term attachments. Adopting an ILM strategy may raise firm's performance because career opportunities provide incentives to put forth more effort via promotion tournaments (Lazear and Rosen, 1981), delayed compensation (Lazear, 1981) or efficiency wages (Shapiro and Stiglitz, 1984) and to acquire firm-specific skills (Gibbons, 1997). Also, employers learn about their employees, which is useful in assigning workers to jobs and reduces firms' hiring and screening costs. An additional reason for the existence of ILMs is that they can provide valuable insurance and stability to employees (Bertrand, 1999). ILM agreements are commonly reached through collective bargaining. Unionisation commonly facilitates grievance procedures and contract revision and renewal that enable the adjustment of these agreements to the changing conditions and to unforeseeable contingencies in a relatively nonlitigious manner.

The discussion so far has clearly outlined unions' opposition to subjective pay mechanisms like the Performance-Related Pay (PRP) scheme and their preference over objective pay setting, the standardisation of wages and seniority policies. Trade unions, by enforcing such pay setting processes in the establishment, create a less competitive and quite secure environment for the covered workers. Individuals, especially those more '*vulnerable*' like seniors and minorities or female workers, feel more protected behind the egalitarian union representatives against layoffs and unfair or discriminating treatment. The standardisation of pay and the wage compression in the organised sector suggest that workers' true productivity and qualifications may not be appropriately acknowledged. In a Mincer wage equation model that would be interpreted into flatter returns to human capital compared to the non-union sector. The worker-friendly pay setting processes that unions advocate mean that workers are not rewarded according to their actual contribution and individual merit, but based on some objective rules. While this is beneficial for part of the workforce, individuals with high qualifications and competitive skills may feel restricted and unsatisfied in an environment like this. High-skilled workers who are willing to voice their concerns to management personally, or are able to find alternative employment relatively easily may not feel the need of representation. Therefore, while for some workers unionism may be regarded as a

'*protective shield*', for some others it is more of a constraint, a burden in their career development. Effectively this may lead to a kind of sorting between the unionised and non-unionised sector based on individuals' need for protection and job security. Murphy *et al.* (1991), in their examination of the union effect on earnings distribution, conclude that "*one principal effect of the pursuit of standard rate policies by trade unions is the attraction of a more homogeneous workforce into union employment*" (pp. 536).

The aim of this study is to explore how trade unions influence individuals' earnings profiles. In particular, we want to examine how unionism interacts with the human capital wage premia, when considered in a Mincer earnings equation framework. From the discussion above, we form two hypotheses that we wish to investigate. First, in workplaces with union representation, the returns to employer-tenure should be higher than in the non-union sector. The main rationales behind this argument are two. Employer-tenure measures the years an individual spent working for a particular employer, i.e. it is the seniority of an individual in a particular job. Since organised sectors are more likely to adopt seniority rules as their pay setting process, instead of PRP schemes, we expect that seniority earnings profiles will be steeper than in workplaces with no workers' associations. Furthermore, as Booth at al. (2001) suggest, relative to non-union workers, union-covered workers are more likely to receive training and they also receive more days of training than their non-unionised counterparts[2]. In addition, they experience higher wage growth and a greater return to training. We can anticipate then that workers in the unionised sector are more likely to accumulate firm-specific skills, through training. Therefore, the returns to employer-tenure, as a proxy for job-specific skills, will be higher for the covered workers.

The second proposition is that the returns to more transferable type of skills, acquired in work and appreciated by a number of employers, are steeper in the less restrictive and more competitive non-union sector. Contrary to the traditional opposition of unions to any pay setting mechanism based on individual merit, managers at workplaces with no union representation are more friendly and supportive to PRP schemes. Concequently, in non-unionised establishments, workers

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[2] A number of other studies on British data have found a positive correlation between work-related training incident and measures of union presence (Booth 1991; Greenhalgh and Mavrotas 1994; Arulampalam and Booth 1998; Green, Machin and Wilkinson 1999).

are more likely to be rewarded based on their actual skills and productivity. Hence, true qualifications and competitive skills should be more important in these jobs than in unionised workplaces.

Booth and Frank (1996) in a recent study on British data propose that union wage differential increase with seniority but only when formal seniority scales exist[3]. In the same spirit, Theodossiou (1996) argues that tenure has a significant positive effect on earnings in jobs with promotion policies, although he does not make any distinction between unionised and non-unionised firms. Nevertheless, this finding is in support of our first proportion since, as the analysis outlined before, the standardisation of pay setting procedures and promotion policies are strongly guarded by unions' '*sword of justice*'. In this paper, there are many similarities with the study of Booth and Frank (1996), however the innovation of this work is that it provides a more detailed and complete map of the acquired human capital that has some rather interesting implications concerning the individuals' earnings profiles. While the previous studies divide accumulated human capital into firm-specific and general labour market, Zangelidis (2002) argues that acquired skills in work should be further decomposed. According to the author, the existing literature overlooks the importance of occupation-specific skills in the wage determination process.

Here we adopt this approach and alongside job-tenure and labour market experience we include occupational and industry experience in our analysis. Job-tenure is usually considered in the literature as a measure of seniority and, under the assumption that workers accumulate firm-specific human capital, as a proxy of non-transferable (between jobs) skills. On the other hand, we can think of occupational experience as a measure of the individual's expertise in a particular occupation, i.e. of the individual's occupation-specific skills that are transferable between different firms/employers within the same job description (occupation). It is of great interest to explore how trade unions and/or formal wage policies in a workplace affect the individuals' earnings profiles when examined at the different levels of transferability of the accumulated skills. According to Booth and Frank (1996) seniority wage scale policies are more likely to be adopted in workplaces where strong trade unions are present and individual productivity is hard to

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[3] In the US literature, Topel (1991) argues that the returns to tenure for union members are larger in magnitude and rising compared to their non-union peers, while Kuhn and Sweetman (1999) looking from a different perspective find that the loss to displaced workers from unionised workplaces is increasing in seniority.

measure. If we imagine such a workplace we would probably expect job tenure, rather than true productivity, to play an important role on earnings. On the contrary, in a more competitive environment, not so restricted by formal wage policies, one might expect that the individual's expertise on the job he performs and consequently his productivity would be more appreciated and rewarded. In this paper we address these questions and explore how workplace features, like unionism and seniority scales, influence the importance of job-tenure and accumulated skills in the wage determination process.

In *Section 2* we provide a brief description of the data set employed for the empirical analysis. Then, in *Section 3*, we examine the interaction between union representation in the workplace and individuals' earnings profiles. We begin our analysis with the estimation of standard union and non-union wage equations, *Section 3.1*, and in the second part, *Section 3.2*, we address the selectivity issue in the estimates, driven by the endogeneity of union status. In *Section 4*, we explore whether we can explain the observed distinct earnings paths in union and non-union jobs with the existence of formal seniority wage policies in these workplaces. Finally in *Section 5*, we conclude the discussion with a summary of the most important findings.

2   Data Description

The empirical analysis of this paper is based on the British Household Panel Survey (BHPS), covering the period between September 1991 and May 1999 (*Waves 1-8*). This is a nationally representative household panel survey of around 5,500 households (containing about 10,000 persons) randomly selected South of the Caledonian Canal (thus excluding the North of Scotland and Northern Ireland). The first survey of the BHPS was conducted in the autumn of 1991, and annually thereafter. The sample used in our analysis is restricted to individuals who are Original Sample Members (OSM). These are mainly individuals within the randomly selected initial sample drawn from the Postcode Address File. All OSMs are followed throughout all future waves of the BHPS where possible. In addition, other respondents not initially included in the initial sample may be added to the group of OSMs when associated with an OSM in the formation of a new household[4].

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[4] The criterion is that the individual needs to be a parent of an OSM's baby, in a newly formed household.

Continuing on the description of the sample used, the individuals considered are male individuals between 18 and 60 years of age, who reported working full-time (at least 30 hours per week) and are not self-employed. Individuals with missing information or imputed data in the variables used in the empirical analysis are excluded from this sample. The earnings variable mainly considered in the estimated wage equations is the natural logarithm of the nominal gross average hourly wage, defined as the usual weekly pay divided by the usual paid hours in a week, including overtime paid. For the construction of the hourly wage, usual paid hours and overtime paid hours in a week are normalised to equal a maximum of 60 hours for the former and 12 hours for the latter. Therefore, an upper bound is imposed on the reported hours of work in order to avoid potential biases from measurement errors in the estimates of interest. The reason we use hourly wage rates instead of weakly or monthly rates is mainly because there may be different patterns that govern the employment conditions and labour supply preferences of employees. Since not all individuals work the same number of hours, their weekly or monthly wages are bound to differ. Using hourly wage rates though, allow us some degree of uniformity across the whole sample, as we incorporate any dispersion in the hours of work.

The BHPS provides valuable information on the employment history of the respondents, which is very useful for the construction of some human capital variables. At each wave their current labour market status is reported, as well as their employment history for the period beginning on 1st of September a year prior to the interview. In addition, information on the complete labour market history of the individuals, since leaving full-time education for the first time, is recorded in the second wave and, complete job data are also collected at the third wave (1993). Based on these records, we are able to follow the sample of individuals since the beginning of their labour market history and construct their total actual labour market experience (full-time), current employer-tenure, occupational and industry-specific experience.

The empirical examination is based on an unbalanced panel sample. This unbalanced panel sample is a sample of employees who appear at least twice, thus the maximum panel length of any sample member is eight years, while the minimum panel length is two years. Some of the main characteristics of this sample are provided in *Table 1*, where averages on employer-tenure, general total labour

market experience, industry and occupational experience are presented separately for the union and non-union sector. Although an analysis on simple descriptive statistics would probably be inadequate and certainly not exhaustive, the figures in the table are quite indicative of some distinct patterns that govern these two sectors. In particular, what is interesting here is the fact that in general the average duration of employment history, measured either as tenure or experience, is longer in the organized sector than in the non-union sector. A finding that probably reflects the higher job stability and security that former workplaces actually offer. The most characteristic example from the table is employees' recorded tenure, where on average men in unionised jobs appear to stay with their current employer about two years more, compared with their peers in the non-union sector.

3   Seniority Earnings Profile Under Unionism

The purpose of this section is to examine the different wage growth paths in the union and non-union sector. Before we address though this question, we need to decide on the definition of union status. We can define union status either at the individual level as union membership, or at the workplace level as union coverage. The choice between the two is actually the answer to whether there is a free-rider problem associated with union membership or not. One of the main roles of trade unions is the improvement of wages and working conditions above the perfectly competitive level (the union's monopoly role). Economists, Olson (1965) among the first, have argued that there is indeed a free-rider problem associated with union wage premium. The reason behind that is that in an establishment, where a union is recognised for pay bargaining, all workers regardless of their membership status can enjoy the improved wages and working conditions. Therefore, the above the perfectly competitive level wages and the better working conditions are normally a collective good since it is difficult to exclude workers who are not union members. Individuals acting as rational economic agents faced with a public good are expected to take a free ride on union membership and enjoy this collective good without incurring the monetary or physic costs of membership. Two recent studies (Booth and Bryan, 2001; Bryson, 2002) using the linked employer-employee data from the Workplace Employee Relations Survey 1998 (WERS) provide empirical evidence to the free-rider argument. The authors examine the membership

premium among covered workers and conclude that there was no union membership wage premium in the late 1990s for Britain's private sector workers[5].

The question that naturally comes to mind is why then individuals still want to join a union or, why union members do not leave the union. Trade unions are also traditionally associated with the provision of friendly society benefits, grievance procedures and the like. These are normally excludable, private goods or services available only to union members that may act as an incentive to workers to unionise (Booth and Chaterji, 1995). In addition, workers may feel the need or pressure to comply with the group norm of union membership (Booth, 1985; Naylor, 1989) or they may join and remain members because they are ideologically committed to doing so. The theoretical rationale and empirical evidence, in conclusion, suggests that the union wage premium is a public good available to all covered workers regardless of membership status. Therefore, in our analysis here we define union status solely based on the existence of a recognised trade union in the workplace. This way we may optimally avoid the '*free-rider*' effect in a union job, which applies to a considerable proportion of workers in United Kingdom.

The discussion in this section focuses on the workers' earnings profiles in the union and non-union sector. In the first part (*Section 3.1*), we present conventional wage equation estimates separately for a workplace with union representation and without. Then in the second part (*Section 3.2*), we concentrate on the issue of the endogeneity of union status, and re-estimate these earnings models, controlling for potential selectivity bias in the results.

3.1   Unionism and Wage Equations

We begin the analysis here by estimating standard Mincer earnings equations separately for the union and the non-union sectors:

$$W_{uit} = \beta_{u0} + \beta_{u1} X_{uit} + \varepsilon_{uit} \tag{1}$$

$$W_{nit} = \beta_{n0} + \beta_{n1} X_{nit} + \varepsilon_{nit} \tag{2}$$

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[5] Similarly, Barth *et al.* (2000) using a matched employer-employee data set for Norway find that individual membership status ceases to have any significant effect on the wage when establishment-level union density is included and conclude that the union wage effect is a pure public good.

where W_{uit} is the log union wage and W_{nit} is the log nonunion wage for individual i at period t. X is the vector of variables determining earnings and β's are the coefficients to be estimated. The dependent variable is the logarithm of the hourly wage rate, including overtime paid hours. The human capital variables on the right-hand side of the equation include job-tenure (measured in decades), actual labour market experience, industry and occupational experience (measured in years)[6]. Alongside these variables, the remaining regressors consist of controls for individual characteristics such as education, skills, qualification and current occupation, workplace characteristics like establishment size and industry sector and regional dummies and a time trend. The results are summarised in *Table 2*, where the derived ten-year effect[7] of tenure, labour market experience and industry and occupation experience is calculated and presented, in order to help the comparison between these two sectors. We acknowledge that the estimates of the effect of these four variables may be inconsistent due to unobserved heterogeneity across individuals and across matches. Although this potential endogeneity bias is not of major concern, We utilise the panel element of our data set and employ panel estimators[8], generalised least square (GLS) and within-group fixed effects (FE)[9],

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[6] Quadratic polynomial for labour market experience and cubic polynomials for the other three human capital variables.

[7] Through out the paper, we present the findings from the estimated earnings model, based on the calculated ten-year effect of the four human-capital variables of interest.

[8] A technical note concerning the estimation process, for identification unit in the panel estimates we use alternatively (I) the individual, and (II) the individual working for a specific employer, i.e. if an individual is observed working for different employers in the sample he is treated as a different unit/individual. The latter method may capture some unobserved job-match effects that the former might not, especially for the estimates on the returns to job-tenure.

[9] When fixed effect estimators are employed, an identification problem arises driven by the presence of both employer-tenure and actual labour market experience in the wage equation model. For those individuals who do not have any part-time employment spell, the increase between two consecutive waves in both tenure and labour market experience is the same. This implies that we cannot simultaneously estimate their effect when using fixed effects (difference from mean). The only case where they can be both estimated is for those individuals who had some part-time working experience between, for example, two consecutive waves. In that case the increase in labour market experience will be higher than the one in employer-tenure. Effectively though that means that the obtained coefficients of labour market experience do not measure its effect on wages, but rather capture this event in their employment history. Therefore, when fixed effect estimators are employed, in order to avoid this kind of identification problem we exclude the linear term of labour market experience from the estimated model. Consequently, in the case of fixed effects the returns to labour market experience are not presented in the tables.

alongside OLS estimator. Finally, on what it concerns the level of identification of the industry and occupation sector for the measurement of the individual's accumulated experience in them, we use alternatively both the 1-digit and 2-digit level of classification.

The results presented in *Table 2* provide a rather interesting insight on the differences in the earnings profiles between the union and non-union sector. If we compare the first half of the table (union) with the second half (non-union) we can derive some distinct paths between the two sectors. Job tenure, while it appears to have a modest but positive and significant contribution in those establishments where workers are organised into trade unions, the same is not true for their peers in the non-union sector. Furthermore, in the union sector labour market experience and occupational experience are estimated to have a significant positive effect on individuals' earnings. However the impact is stronger in the less restricted non-unionised workplaces. This is especially true for occupational experience, where the calculated contribution (ten-year effect) is at least double the size compared to the union sector. Finally, wages, in the second half of the table, appear to increase with industry experience, particularly when the latter is measured at the 2-digit level of classification. According to these findings, seniority and/or firm-specific skills are important only in workplaces with trade unions present. In work environments though less protective and restricted, it is the more competitive and transferable kind of human capital that really matters in the wage determination.

This first attempt to explore the earnings profiles in the covered and non-covered sector sheds some light. From the wage equation models on the male employees we can conclude that seniority is closely related to wages in workplaces where trade unions exist. In these protected working environments where formal policies probably exist concerning the employment and the level of wages, senior workers are more valued compared with their junior colleagues. However, individuals with competitive and transferable skills, such as occupation-specific skills, are far better of in jobs less restricted where their true productivity is more likely to be acknowledged.

One main source of concern with the above findings is the endogeneity of union status. Individuals are not randomly assigned in the union or non-union sector. On the contrary, the distribution of workers among these two sectors is governed by rational decisions and behaviours of both the employees and the employers.

Workers select themselves into their most preferred sector, while employers choose from the pool of available workers those individuals that they desire. An obvious issue that arise from this discussion is the potential sample selection bias in the previous estimates. The two samples, in the union and non-union sector, may be characterised by different features concerning both the individuals and the workplace. In other words, the estimated differences in the wage equation models between the two sectors may after all be the result of the likely heterogeneity of the two samples, rather than genuine distinct patterns in the earnings profiles. We explore this route in the following section and address the selectivity issue in the wage equation framework.

3.2 Endogeneity of Union Status

It is generally agreed that union status should be treated as an endogenous variable (Dungan and Leigh 1985). The fact that, for example, we observe an individual in the union sector is the result of distinct systematically made decisions from the two parties involved (employees and employers), where they both aim to maximise their utility. A theoretical model, mainly developed in the US literature, that describes this whole process is the '*queuing model*' based on the influential and pioneer work of Abowd and Farber (1982) that basically involves a dual selection process. Workers, based on the utilities that each sector yields to them, make explicit decisions regarding their desire for union representation in their workplace. However, the preference towards the union sector does not necessarily result into employment on a union job, since it is the employer who decides whom to employ from the available queue of workers, in order to produce at minimum cost. Hence, "*a worker's union status is determined by both a desire for a union job and the employer's selection criteria*" (pp. 355). In other words, the observable event of union status requires the queuing process from the employee's side and her being selected by the employer.

Although such a theoretical model may be quite insightful on the behaviours that govern the observable event of union status, it is still questionable whether it is applicable to the British labour market or not. Furthermore, since the only event the researcher observes is the union status is quite difficult to distinguish these two steps (queuing and selection) and discern whether non-union workers did not actually desire to work in a union job, or were just not chosen from the queue, although they

wanted union representation. In practice that means that unless we can find at least one variable that is contained in one model (e.g. queuing) but not in the other (e.g. selection) we are unable to distinguish these two processes and identify the possible different behaviour patterns that characterise them. Therefore, due to the ambiguous validity of the model for the case of Britain and to limitations in our data set, we do not pursuit this route. Instead we estimate a probit model on the event of union status that although it does not provide us with any insight on both employees and the employers' decisions, it still serves well its purpose concerning the control of selectivity bias.

Specifically, we estimate the structural form of the union status model, specified as:

$$Union_{ij}^* = \alpha_0 + \alpha Z_{it} + \varepsilon_{it} \tag{3}$$

and

$$Union_{it} = 1 \text{ if } Union_{it}^* > 0 \text{ and } = 0 \text{ otherwise}$$

where $Union_{it}^*$ is the latent variable indicating union representation in the workplace, $Union_{it}$ is the observed union status, Z_{it} is a vector of personal and job characteristics and $\varepsilon_{it} \sim \left(0, \sigma^2\right)$.

The regressors Z_{it} included in the union probit model are those used in the earnings equation model presented above. However, for identification purposes we require at least one more variable that affects the event of working in a job with union representation that has no obvious impact on wages. The author suggests that individuals' political beliefs may influence ones decision of whether or not to work in an unionised environment but they do not have any effect on their earnings profile. We can think of ideology as a proxy of what the views and perceptions of an individual are concerning various aspects of everyday life, including trade unions and collective bargaining in the workplace. Under this assumption, we would expect people located in the center and left at the '*political map*' to be friendlier towards the idea of unionism and collective action[10]. ***Figure 1*** gives us a vague idea on how individuals, according to the party they support, are distributed between the

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[10] Arabsheibani and Marin (2001) use similar identifying variables for the construction of a structural union-membership equation in a selectivity-corrected union wage gap model for UK. Commenting on the validity of their choice, the authors argue that "*in the U.K. trade unions have always been closely associated with the Labour Party in particular, and with more left wing policies in general*" (pp. 2).

union and non-union sector. Although one might argue that this is a rather traditional view, questioning its validity in nowadays, the empirical findings presented below support our initial assumption. Hence, alongside the regressors from the wage equation model we include three dummy variables corresponding to whether the individual feels closer to the Conservative party, Labour party or the Liberal Democrats[11]. BHPS contains a series of questions on respondents' political views. In particular, individuals are asked if they support a particular political party, and if so which party they regard themselves as being closer to than the others. The replies to these two questions form the basis for the construction of the political beliefs dummy variables that we use below.

Table 3 presents the derived marginal effects from the estimated union status probit model. The model is estimated both at 1-digit and 2-digit of industry and occupational classification, however the results remain fairly similar irrespectively to the chosen level of identification. Before we move on to the findings, it should be stretched out that the interpretation of the results is not a straightforward one. The difficulty arises from the fact that the actual process of joining a union job is unobserved to the researcher. Therefore, we reckon that it would probably be more appropriate to interpret the findings as the effect that individual and job characteristics have on the probability that one is observed in a unionised workplace, rather than attempt to suggest behavioural strategies from the employers and employees. Starting with the findings, in general the signs on the significant variables in the union status equation are what would be expected *a priori*.

The polynomial terms of job tenure appear to be significant, suggesting a positive relationship between seniority and union status. One possible interpretation of this finding is that the individuals who plan to stay for many years in a job and accumulate tenure are more likely to be observed in a workplace with union representation. Apparently, the security that trade unions offer provides an incentive to those individuals who seek stability in their careers. On what it concerns the political beliefs, the individual used as the base for the estimates is he

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[11] The methodology employed here relies on the conventional assumption that individuals' political views and party attachment are rather stable in the long term (Green and Palmquist, 1990). Therefore, while short-term factors (e.g. economic conditions) may influence voters, such shifts are transitory, as individuals are expected rather soon to return to their preferred party. Within this framework, political beliefs are formed at an early life stage based on parents' given preferences, socio-economic status, race, religion and region and remain fairly stable over the years.

who supports a party different from the three most popular mentioned above or, no party at all[12]. According to the findings, the workers who support the Labour party are those most likely to be observed in an unionised environment, followed by the Liberal Democrat supporters. Those located to the right in the political spectrum are less likely to work in the unionised sector, compared to the supporters of the other two major parties. Furthermore, the results suggest some strong regional effects especially for the North and the Wales, where the probability that an individual is employed in a union job are higher compared to the reference region of the South. In addition, the model captures some industry and occupation[13] effects on the probability of union status suggesting that some sectors are more likely to have union representation than others, or simply that workers in particular sectors prefer more to work in a unionised place. More specifically, individuals in *Agriculture, Energy* and *Manufacture of Metals, Mineral Products and Chemicals* sector as well as *Other Services* are more likely to work in an unionised environment. While those in *Metal Goods* and *Engineering* industries and in *Hotels* and *Catering* sector are the least likely to be represented by a trade union. Moreover, those with *Managerial* and *Professional* occupations have lower probability of being observed in an unionised workplace compared with employees in other occupations. According to the estimates, the occurrence of union status is more likely in larger workplaces, which is something that we should expect since union representation in general is more likely to be observed in workplaces with a large number of employees. Two last remarks on the findings, semi and high skilled workers, as well as non-manual workers are those that are most likely to be working in a union job. And finally, the probability of union status reduces as the years pass. Whether though this occurs because unionism overall declines through the years or simply because of some unobserved time trend captured in the data is not clear.

Before we continue to our analysis, there is another issue that worthies also addressing here. The estimates on the union-status probit model in *Table 3* suggest a positive relationship between union-status and job seniority. One interpretation that we suggest above is that individuals who prefer stability to possibly frequent job changes are more likely to find employment in an unionised environment. However, there may be an alternative explanation to this estimated effect. Employer-tenure

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[12] The base group, those who support a party other than the three main ones or does not support any, is approximately one quarter of the whole sample.

[13] A complete list of the industry and occupational dummies considered is provided in the Appendix.

may be endogenously determined by some unobserved individual and workplace characteristics that may also influence whether an individual is employed in a unionised sector or not. Similarly to a wage equation model, the estimated positive effect of tenure may actually be driven by the correlation with individual and workplace characteristics not observed to the researcher. Here we attempt to clarify this issue and take a closer look on the potential endogeneity of the obtained job-tenure effect.

A test of endogeneity always requires the specification of a list of instruments for the variables under suspicion. For that purpose of our analysis we employ the instrumental variables suggested by Altonji and Shakotko (1987) (AS thereafter), where employer-tenure is instrumented by the deviation from its job-match mean for every individual. On the basis of this instrument we compute a test of exogeneity for the union-status probit model as proposed by Smith and Blundel (1986). This test is related to the Davidson-MacKinnon auxiliary regression test for exogeneity in a regression context (an alternative to the commonly used Hausman test). This test involves a two-step estimation process. In the first stage, the variables suspected for endogeneity are expressed as a linear projection of a set of instruments, those specified by the researcher plus all other explanatory variables of the probit model. The residuals from each first stage instrument regression are then included in the probit model. A test on the joint significance of the coefficients on the residual series is performed. Under the null hypothesis, the probit model is appropriately specified with all suspected variables as exogenous, i.e. the residuals from the auxiliary regressions should have no explanatory power. A rejection of the null hypothesis indicates that the standard probit estimator should not be employed. The performed Smith-Blundel test of exogeneity, based on the AS instrumented variables for tenure, rejects the null hypothesis with a *Chi-square* ($X^2_{(3)}$) of 10.936 (*Chi-square*: 11.809, when industry and occupational experience are measured at a 2-digit level). Employer-tenure appears to be endogenously determined in the union-status probit model. After all, the unobserved individual and workplace characteristics that affect the presence of an individual in an unionised workplace appear to influence also the duration of his employment spell in that job.

As an alternative model to the union-status probit model in *Table 3*, we can employ the instrumental variable probit model using Amemiya Generalised Least Squares

(AGLS)[14] that is used for estimating probit models where some of the independent variables are endogenous (in our case the employer-tenure polynomial). The estimates from this IV-Probit model on union-status (not included here) reduce the estimated effect of tenure both in magnitude and in statistical significance. Seniority does not appear to have an explanatory role anymore in the event of been employed in a union-sector. The findings from the IV-Probit on the rest of the regressors remain fairly similar to those provided in *Table 3*. Apparently, what this analysis implies is that the previously estimated positive relationship between union-status and job-tenure may actually have to do with the fact that tenure is endogenously determined in this probit model[15]. Nevertheless, for the estimation purposes of Heckman's selection model on the earnings equations we employ the probit model presented in *Table 3*.

Moving now in our analysis, if union status is endogenous in a wage equation framework, then:

$$E(\varepsilon_{uit} \mid Union_{it}^* > 0) \neq 0 \text{ and } E(\varepsilon_{nit} \mid Union_{it}^* \leq 0) \neq 0$$

This means that OLS estimated coefficients of the wage *Equations (1)* and *(2)* are inconsistent. In *Table 4* we present the estimated earnings equations, where we control for selectivity, based on the union status probit models discussed above. The Heckman maximum-likelihood estimates overall deliver rather similar estimates to those summarised in *Table 2*, where we do not control for potential sample selection bias. According to the results, job tenure has a positive and significant effect only in the union sector. Apparently, seniority is an important determinant of individuals' earnings profiles in a workplace with union representation[16]. A finding that verifies

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[14] Maddala (1983) provides a good summary of how AGLS works and Newey (1987, eq. 5.6) the specific formulas used for the estimation.

[15] We should acknowledge though that our discussion here relies on the specific instruments used and consequently on how appropriate and valid they are for the sample.

[16] The selectivity-corrected model presented here does not consider the fact that employer-tenure may be endogenously determined in the union-status probit model. This may cast some doubt on the reliability of the estimated tenure effect in the former model. However, a performed Hausman test on the exogeneity of tenure in a wage equation model (as the one presented in *Table 2*) on the whole sample of male employees and separately on the union and non-union sub-samples, based on the AS instruments, is in favour of the OLS estimator (estimates not included here). Therefore, although the duration of the current employment appears to be simultaneously determined with the union-status, it behaves as an exogenous explanatory variable in the wage determination process, both in the union and non-union sector. This finding may reinforce our confidence on the derived estimates on seniority.

our discussion above on the role of trade unions on the remuneration policies adopted by the management and their positive attitude towards the standardization of wages and seniority policies. On the other hand, total labour market experience appears to have a contribution of similar magnitude on both sectors. Occupational experience, although, is appreciated and rewarded in both sectors, the magnitude of its effect on wages differs between them, with the non-union sector being more appreciative to it. The derived returns to ten years of occupational expertise in the, more competitive and less structured, non-union sector are more than triple in size compared to the well protected working environment of a union job. Finally, the results suggest that selectivity is significant only in the non-union sector. The positive sign of *rho* at the bottom of the table for the non-union sector simply indicates that the factors, which have a positive effect on the individual's earnings in the non-union sector also, raise the probability of being observed in this sector.

The discussion presented here sheds some light to the different earnings paths followed in the union and non-union sector. The results strongly suggest that seniority plays an important role in the earnings profiles of those working in a workplace with union representation. On the contrary, in the more competitive and meritocratic environment of a non-union job, individuals appear to be rewarded for their true productivity and expertise. In the next section, we explore whether this phenomenon has to do merely with the presence of a trade union or with the existence of formal wage scale policies in that sector and what happens if no such policies are adopted in the union sector.

4   Pay-Rise Policies and Human Capital Wage Premia

Our findings in *Section 3* imply the presence of distinct seniority-wages profiles between the union and non-union sector. Here, we attempt to provide a better understanding of the underlining mechanism in the unionised workplaces that drives these strong seniority-earnings ties. Trade unions are traditionally associated with the standardisation of pay-setting procedures and the adaptation of seniority rules in the workplace. In the previous section we examine whether union wage differentials increase with seniority without though making any distinction about the presence of pay-rise rules. The observed steeper seniority profiles may universally be true for the whole covered sector, as the findings above suggest or, they may actually be driven by formal objective rules related to pay-setting that

unions through bargaining enforce in the workplace. If the latter is true, then what happens in those establishments with union representation but no formal seniority policies? Are senior workers less protected in this case? These are the issues that we address in this section and attempt to shed some light on.

There are two candidate questions from BHPS that can help us identify workplaces where formal wage policies are adopted. Individuals are asked whether seniority wage scales exist in the current job[17]. In addition, there is another question, more general though, on the promotion opportunities in their current job[18]. The author is in favour of the former because it appears to be more directly linked to wages than the latter, which is broader in the sense that it may refer to aspects of work not related to earnings such as the job description, responsibilities and work conditions. From the 2834 male workers who reported that they have opportunities for promotion, only 1485 were expecting a pay-rise next year. Therefore, we base our analysis on the information that individuals provide in BHPS concerning the existence of formal wage scale policies.

At the first part of this section, we present estimates on wage equations, similar to the ones in the previous section[19], where we divide and examine separately the workers depending on the existence of incremental wage scale policies in their current job. *Table 5* summarises the estimated effects in jobs with pay-rise and no pay-rise. Employer-tenure does not appear to have an important role here in these estimates. The only case where we derive a significant and positive effect is when pay-rise policies are adopted, based on the OLS estimator. Total labour market experience has a strong positive effect on both cases, workplaces with or without seniority policies, but its effect is marginally stronger in the latter case. Furthermore, industry experience appears to have a significant and positive contribution only when measured at the more detailed 2-digit level of industry classification and in workplaces with pay-rise rules. The evidence also suggests that the more competitive and transferable occupation-specific skills are highly rewarded in the less restricted and more flexible workplaces where no formal seniority-wage scales

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[17] The question addressed is: "*Some people can normally expect their pay to rise every year by moving to the next point on the scale, as well as receiving negotiated pay rises. Are you paid on this type of incremental scale?*".

[18] "*In your current job do you have opportunities for promotion?*".

[19] The sample size marginally reduces for the employees, due to missing information on the existence of wage scales in their current job.

exist. The findings overall imply that there are obvious similarities between the earnings profiles in a union job and in a job with seniority-wage scales. We continue our analysis towards that direction and we first explore which are the individual and job characteristics that determine the existence of scale coverage in a workplace.

The probit estimates of the determinants of scales coverage are given in *Table 6*. The two main findings that stand out are the strong union effect and the role of firm size in the adoption of wage scale policies. Workplaces with trade unions present are more likely to have seniority wage scale rules. According to the estimated marginal effect of union job, union representation increases the probability of adopting a seniority-wage rule by 20 per cent, a rather significant effect. The '*discriminating monopoly*' view, discussed above, provides the theoretical reasoning why trade unions may relate wages to seniority through formal scales. It worthies noting that in these estimated models we consider only the presence of a trade union in the workplace and not the individual membership. In an alternative specification (results not presented here) we include union membership in the regressors vector. The interesting result that comes out of this model is that whether an individual is a member of a trade union or not does not appear to have any notable effect on the probability of getting a pay-rise next year. What this finding really implies is that adopted seniority-earnings policies, probably as the outcome of a bargaining process between the management and union representatives, apply to all covered workers in the establishment, regardless of their membership status. More explicitly, wage incremental policies are public goods, not excludable to workers who did not join the trade union. Antithetically, when we estimate a similar probit model on the probability of getting a promotion the following year (the other candidate variable, available in BHPS) we find that union membership increases significantly the chances of being promoted (estimates excluded from the analysis). The estimated positive and significant effect of union membership in the latter model clearly suggests that promotions when negotiated by a trade union are more of a private good, available mainly to union members. This is a quite interesting finding which in a way provides further support and reasoning to our initial choice of pay-rise policies instead of promotions as proxies of pecuniary future prospects of individuals' current employment. As mentioned earlier in the paper, recent studies provide evidence of the '*free-rider*' phenomenon in unionised workplaces. Therefore since the improvement of wages is normally a collective good available to all workers in the union sector, we would expect that individuals could benefit from

policies related to their wages without necessarily having to join a trade union. And, that is exactly what we find from these estimated probit models.

Continuing now to the remaining of *Table 6*, we observe that as the size of the workplace increases, so does the probability of implementing a formal wage policy. This is something that one should expect, since seniority wage scale is likely to emerge as an alternative to individual performance related or merit pay in work-environments where productivity and output are difficult to monitor. This is especially true for firms with many employees, where due to the large scales of production it is inherently hard to measure productivity. Individuals who are already employed in a job, which requires substantial total labour market experience or industry experience, have a higher probability of operating under a pay-rise policy, compared with other colleagues. Occupational expertise, on the other hand, has a positive effect on wage scale rules, especially at the early stages of skills-accumulation (this is true only at the 1-digit level of occupation classification though). Finally, workers in *Agriculture*, *Energy* and *Manufacture of Metals, Mineral Products* and *Chemicals* and *Other Services* industries are significantly more likely to be covered by wage scales.

Following Booth and Frank's (1996) analysis we re-estimate the pay-rise probit model, this time making a distinction between the union and non-union sector (estimates not included in the paper). While Booth and Frank suggest that, in non-union jobs, scales do not affect earnings and the variables in their data set do not explain the existence of wage scales, our findings between the two sectors have some similarities. Many of the individual and job characteristics that play a significant role in union jobs appear to do so also in workplaces with no trade unions present. Therefore we cannot really distinguish any different pattern towards the implementation of wage policies in these two sectors.

Two main conclusions are drawn from the analysis so far. Seniority earnings profiles are quite distinct between jobs with wage scales policies and those with no such formal earnings rules. In addition, unionism has a strong positive effect on the probability of adopting a scale rule in the workplace. In the final part of this section, we investigate the earnings equations in the union and non-union sector, where we control for the existence of formal wage policies in these environments. The question we aim to answer here is whether the formal seniority policies, which are more likely to be adopted in an unionised workplace, are the reason behind the

steeper seniority-earnings profiles we observe in the union sector. An issue of concern that arises from the estimates presented in *Table 5*, as well as from the estimates presented below is the selectivity issue. The findings from the probit models on the existence of wage scales outlined the importance of various individual and workplace features on the adoption of such policies. The problem that the researcher faces in these cases is the selection of the appropriate controls that could serve for the identification of the selectivity variables in the earnings equations. In other words, we need to find some variables that influence the occurrence of a wage scale policy, but are not expected to have any direct impact on the wage determination process. Theodossiou (1996) suggests various controls on employees' social background and the employers' or employees' attitudes and characteristics, which can be included in the probit equation for the identification purpose. We explored this path, by examining various variables that optimally could serve this identification purpose, such as training provided by the employers and the presence of a second job. However, data limitations prevent us from finding such appropriate controls. Therefore, in the estimated earnings models presented below we do not correct for potential selectivity bias. Another possible source of sample selection is the fact that individuals are not randomly assigned in union or non-union jobs. Following the analysis presented in *Section 3.2*, we similarly control for this union-driven sample selection bias in the discussion below.

Optimally, this selectivity correction may capture some of the possible former selection bias, since union jobs are more likely to implement a formal wage scale policy. In a way, when we identify the union selectivity variables in the estimated wage equation model, we may be incidentally doing so for the wage policy selectivity as well. The reason is that, as the union and wage scale probit models suggest, the individual and workplace characteristics that determine whether we observe a worker in a union job or not, are broadly the same that influence the allocation of the individual in a job with seniority scales or not. In what follows, we estimate a wage equation model on four sub-samples depending on whether there is union representation and formal wage scale policies in the workplace. We acknowledge the fact that we cannot '*entirely*' control the pay-rise selectivity issue and probably we should bear that in mind when investigating the findings presented below. However, when we make comparisons within the unionised sector between workplaces with and without formal seniority-wage rules, the selectivity issue probably is not very important. Our intuition is that the individual characteristics and workplace features that determine the adoption of such rules in

an establishment are likely to be present in both union sub-samples. After all, unionism, and consequently the determinants of union representation in a workplace, is one of the main explanatory variables in the estimated pay-rise probit model. The pay-rise selectivity issue may be more serious when we make comparisons between the union and non-union sector, where their main sample characteristics are likely to differ. If we control though for union-status sample selection we control for the differences in the two sub-samples (union and non-union). The differences that are also likely to influence the adoption of a formal wage rule in a workplace. Hence even in the case where we make comparisons between the two sectors it is not clear to the author how '*corruptive*' this potential pay-rise sample selection may eventually be.

Table 7 summarises the main findings from the estimated earnings models. The first half of the table corresponds to jobs with pay-rise policies and the other half to jobs with no such formal policy. Similarly, the first two columns refer to union jobs (1-digit and 2-digit of industry and occupation classification, respectively) while the other two to non-union ones. We present the derived ten-year effect of these four seniority and human capital variables of interest (with the standard errors in parentheses). The findings reveal some rather interesting patterns in the individuals' wage profiles. Employer-tenure is estimated to have a positive and significant effect of around 6 per cent (ten-year effect) on wages only for employees in workplaces with union representation and formal pay-rise policies (the most restricted workplace of all possible four). Antithetically, occupational expertise is appreciated only in the non-union sector, especially when no seniority rules are adopted (the least structured working environment). In addition, total labour market experience has a similar positive effect of around 15 per cent (ten-year effect) in both these two types of workplaces. These findings clearly provide support to the two propositions set earlier in the paper. What we observe here is that while firm seniority and specificity are important in the most structured and well-protected and secure environments, occupational expertise and the more competitive kind of skills play a major role in the less restricted and more demanding workplaces. Generally though in the union sector, it is seniority, measured either by tenure or labour market experience, which has an important role in the wage determination process. Total labour market experience, although significant in both '*types*' of union jobs, it appears to play a more important role when no formal policies are adopted. The absence of formal wage rules does not mean that informal, unwritten rules do not exist in these workplaces. In fact, it is quite likely that even in these union jobs

employers follow some kind of seniority rule concerning employment and wages. In jobs with no collective representation, apart from occupational expertise, labour market experience appears to have an important role on wages. It is interesting though to notice that the returns to labour market experience double in size (ten-year effect) when seniority scales are applied, an indication that seniority in general is quite important when wage scales are adopted. Overall, the findings suggest that there are different earnings profiles depending on seniority scales and union representation. Especially though within the non-union sector the diversity is more obvious, probably because in union jobs even if formal wage policies do not exist, some kind of unwritten seniority rules should govern employers' decisions.

The findings here imply that the existence of formal wage scales and union representation in a workplace has a significant influence on the seniority and human-capital earnings profiles. More specifically, seniority appears to be quite important in workplaces with formal wage scale policies both in the union and non-union sector. Furthermore, the estimates suggest that unionised jobs appreciate and reward seniority even when no pay-rise rules are adopted. A possible rationale is that in jobs with union representation even if no such formal policies exist, there probably are some unwritten seniority rules that govern employment and earnings determination. Non-union jobs with no incremental wage scales, on the other hand, are more responsive to workers' skills, expertise and true productivity.

5   Conclusion

In this paper we explore how institutional arrangements influence employees' wages. Particularly, the focus of this examination is to distinguish the different paths seniority-earnings profiles follow depending on whether the individual is employed in a workplace where trade unions and collective bargaining are present and/or where formal wage scale rules are adopted. Trade unions are traditionally associated with the standardisation of pay-setting procedures, the enforcement of objectives rules concerning promotions and wages in the workplace and are generally hostile to Performance-Related Pay and individual merit schemes. Within this framework, we set two propositions related to seniority profiles and union representation. In particular, we argue that in the union sector it is expected that job seniority and skills specificity will be an important determinant of wages, while in the less structured non-union sector true productivity, proxied by the more

competitive accumulated skills and professional expertise, will have a key role on earnings profiles. Indeed our analysis on male employees verifies both propositions.

Overall, it appears that senior workers, compared to their junior colleagues, are better off when covered by formal incremental scales, since seniority wage profiles are estimated to be steeper in these jobs. Furthermore, as the results suggest, formal wage rules are more likely to be adopted in workplaces with union representation. A theory that provides a rationale for this finding is the discriminating monopoly view discussed earlier in the paper. In this framework, a multi-part pricing policy that takes the form of seniority wages is adopted in order to achieve greater total income for the trade union (monopolist) and reduce turnover and quits of the more valued, senior workers from the employers' point of view, in working environments where true productivity is difficult to measure. Nevertheless, there are indications that seniority plays a significant role even in union jobs with no such scales rules. One possible explanation, in the same spirit of this discussion, is that unwritten policies, which actually serve the same purposes as formal rules, are quite likely to be adopted in these union jobs. Occupational expertise, on the other hand, is highly rewarded in less restricted or structured environments, where individual productivity can be measured. The analysis implies that in jobs with no formal incremental scales, and especially in the non-union sector, employees' wages are determined by their competitive accumulated, occupational-specific skills rather than their seniority. In conclusion, workplaces with union representation and formal seniority earnings policies *'favour and protect'* their senior employees, while the more competitive non-union sector jobs are fairer in the sense that they reward the workers based on their true qualifications and output productivity. We believe that the discussion here generates some interesting findings concerning workers earnings profiles and unionism in the British labour market of the 1990s. Trade unions, in this era of declining membership and representation power, still ensure either through formal policies, or unwritten rules a structured and well-protected environment for all covered workers.

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Tables

Table 1

Sample Characteristics (BHPS): Waves 1-8

No. of Individuals	985	
No. of Observations	5027	
No. of Employees in a Union Job	2964	
No. of Employees in a Non-Union Job	2063	

	Mean (S.D.)	
	Union	Non-Union
Age	40.40	38.92
	(9.69)	(9.88)
Employer Tenure	8.54	6.26
	(7.25)	(5.88)
Industry Experience (1-digit)	13.82	12.37
	(9.73)	(10.16)
Industry Experience (2-digit)	11.54	9.34
	(9.39)	(9.31)
Occupational Experience (1-digit)	12.05	10.32
	(9.90)	(9.75)
Occupational Experience (2-digit)	9.56	8.03
	(9.23)	(9.04)
Actual Labour Market Experience (full-time)	23.02	21.30
	(10.38)	(10.64)

Table 2

Wage Equations & Unionism

	OLS		GLS(I)		GLS(II)		FE(I)		FE(II)	
	1-dgt	2-dgt	1-dgt	2-dgt	1-dgt	2-dgt	1-dgt	2-dgt	1-dgt	2-dgt
Union										
T10	.038	.038	.052	.047	.032	.028	.065	.057	.011	.003
	(.022)	(.023)	(.022)	(.022)	(.025)	(.026)	(.025)	(.025)	(.039)	(.039)
Exp10	.189	.202	.209	.218	.209	.218				
	(.022)	(.022)	(.031)	(.030)	(.031)	(.030)				
Ind10	.003	-.005	.004	.028	-.002	.014	.015	.044	-.004	.020
	(.023)	(.021)	(.021)	(.018)	(.022)	(.018)	(.023)	(.019)	(.024)	(.020)
Occ10	.045	.039	.050	.033	.042	.028	.035	.022	.021	.014
	(.021)	(.020)	(.018)	(.017)	(.018)	(.017)	(.019)	(.018)	(.020)	(.018)
Sample	2964									
Non-Union										
T10	.033	.016	-.003	-.001	.015	.009	-.011	-.002	.040	.040
	(.033)	(.033)	(.030)	(.030)	(.036)	(.036)	(.035)	(.035)	(.067)	(.067)
Exp10	.184	.201	.279	.300	.215	.232				
	(.033)	(.031)	(.041)	(.039)	(.041)	(.040)				
Ind10	.004	.060	.039	.041	.056	.056	.036	.029	.050	.043
	(.031)	(.029)	(.027)	(.022)	(.027)	(.023)	(.028)	(.023)	(.029)	(.024)
Occ10	.166	.124	.119	.074	.118	.087	.086	.042	.066	.049
	(.030)	(.029)	(.025)	(.024)	(.026)	(.024)	(.026)	(.024)	(.028)	(.025)
Sample	2063									

Notes: Standard errors reported into brackets. In panel estimators (I), the identification unit is the individual. In panel estimators (II), the identification unit is the individual working for a particular employer.

Table 3

Union Status Probit Model				
	1-digit		2-digit	
	dF/dx	z-stat.	dF/dx	z-stat.
Human Capital				
Ten/10	.298	4.22	.307	4.27
$(Ten/10)^2$	-.139	-2.50	-.153	-2.71
$(Ten/10)^3$	.022	1.91	.027	2.22
Exp	-.005	-1.43	-.005	-1.47
Exp^2	1.23e-04	1.52	1.33e-04	1.70
IndExp	.009	1.59	.001	0.20
$IndExp^2$	-2.70e-04	-0.71	5.20e-04	1.27
$IndExp^3$	2.27e-06	0.34	-1.53e-05	-2.05
Occexp	-.005	-0.84	.004	0.78
$Occexp^2$	3.66e-04	0.96	-3.79e-04	-0.96
$Occexp^3$	-8.04e-06	-1.18	6.28e-06	0.86
Leave	5.58e-04	0.15	-7.31e-05	-0.02
Region				
London	.018	0.59	.012	0.38
North	.087	4.01	.085	3.93
Midlands	.019	0.85	.017	0.79
Wales	.073	1.84	.074	1.85
Scotland	-.020	-0.61	-.016	-0.47
Political Beliefs				
Conservative	.045	2.08	.047	2.18
Labour	.157	7.83	.159	7.92
Liberal Dem.	.101	3.37	.107	3.56
Industry Sector				
SIC 2	-.345	-6.76	-.352	-6.89
SIC 3	-.406	-9.65	-.396	-9.38
SIC 4	-.297	-6.75	-.299	-6.80
SIC 5	-.201	-3.94	-.209	-4.11
SIC 6	-.419	-9.37	-.417	-9.32
SIC 7	.042	0.91	.036	0.79
SIC 8	-.256	-5.53	-.254	-5.50
SIC 9	.171	4.24	.171	4.24
Firm Size (ascending)				
Firm Size 2	.109	1.41	.108	1.40
Firm Size 3	.101	3.93	.097	3.78
Firm Size 4	.191	7.73	.187	7.58
Firm Size 5	.203	8.23	.199	8.09
Firm Size 6	.309	14.26	.309	14.25
Firm Size 7	.322	13.70	.321	13.65
Firm Size 8	.348	14.35	.349	14.41
Occupation				
SOC 2	.082	2.60	.085	2.70
SOC 3	.058	1.49	.066	1.68
SOC 4	.107	2.32	.110	2.39
SOC 5	.107	2.06	.109	2.11
SOC 6	.148	3.13	.144	3.04
SOC 7	.029	0.56	.039	0.77
SOC 8	.173	3.50	.176	3.59
SOC 9	.252	4.37	.256	4.46
Skills				
Semi-Skilled	.182	3.07	.179	3.03
High-Skilled	.189	2.98	.187	2.94
Foreman	.102	1.58	.101	1.56

(*Table 3* continued).

Non-Manual	.185	2.85	.183	2.82
Prmg	.042	0.58	.046	0.63
Qualifications				
High-Degree	.082	1.42	.089	1.57
First-Degree	-.030	-0.67	-.031	-0.70
Teaching Qual.	.090	1.34	.093	1.39
Higher Qual.	.043	1.50	.045	1.60
Nursing Qual.	.118	0.77	.137	0.89
A-Level	.117	3.74	.118	3.78
O-Level	.030	1.06	.034	1.21
Commql	-.086	-0.67	-.100	-0.78
CSE	-.010	-0.25	-.009	-0.21
Apprent	-.087	-1.68	-.091	-1.79
Other Qual.	.164	1.91	.168	1.97
Time Trend				
Wave	-.021	-5.45	-.021	-5.47
Sample	5027			

Notes: Derived marginal effects.

Table 4

Wages Equation Corrected for Selectivity				
	Union		Non-Union	
	1-dgt	2-dgt	1-dgt	2-dgt
T10	.040	.040	-.025	-.051
	(.023)	(.024)	(.035)	(.036)
Exp10	.189	.202	.188	.205
	(.022)	(.022)	(.034)	(.032)
Ind10	.004	-.004	-.011	.053
	(.023)	(.021)	(.032)	(.030)
Occ10	.045	.039	.163	.114
	(.021)	(.020)	(.031)	(.030)
rho	.025	.035	.561	.613
	(.131)	(.130)	(.069)	(.059)
LR-test (X^2)	0.03	0.07	17.83	22.07
Sample	2964		2063	

Notes: Standard errors into brackets.

Table 5

	OLS		GLS(I)		GLS(II)		FE(I)		FE(II)	
	1-dgt	2-dgt	1-dgt	2-dgt	1-dgt	2-dgt	1-dgt	2-dgt	1-dgt	2-dgt
Pay-Rise										
T10	.074	.070	.045	.030	.039	.027	.028	.013	-.018	-.021
	(.027)	(.027)	(.027)	(.027)	(.030)	(.030)	(.032)	(.032)	(.052)	(.052)
Exp10	.175	.189	.224	.227	.207	.211				
	(.026)	(.025)	(.033)	(.032)	(.034)	(.033)				
Ind10	.017	.048	.015	.053	.011	.048	.019	.050	.002	.033
	(.028)	(.026)	(.026)	(.022)	(.026)	(.022)	(.030)	(.024)	(.031)	(.025)
Occ10	.040	.011	.055	.047	.044	.038	.061	.060	.039	.041
	(.025)	(.025)	(.022)	(.021)	(.022)	(.021)	(.024)	(.023)	(.025)	(.024)
Sample	2233									
No Pay-Rise										
T10	.003	-.003	.018	.019	.010	.011	.044	.049	.027	.030
	(.026)	(.027)	(.025)	(.026)	(.029)	(.029)	(.030)	(.030)	(.054)	(.054)
Exp10	.199	.215	.238	.262	.214	.236				
	(.027)	(.026)	(.035)	(.033)	(.035)	(.034)				
Ind10	.016	.021	.023	.024	.034	.033	.033	.019	.028	.027
	(.026)	(.023)	(.022)	(.019)	(.023)	(.019)	(.024)	(.020)	(.025)	(.020)
Occ10	.121	.094	.095	.055	.093	.057	.051	.013	.031	.006
	(.024)	(.023)	(.021)	(.019)	(.021)	(.020)	(.022)	(.020)	(.023)	(.021)
Sample	2780									

Wage Equations & Seniority Scales

Notes: Standard errors reported into brackets. In panel estimators (I), the identification unit is the individual. In panel estimators (II), the identification unit is the individual working for a particular employer.

Table 6

Pay-rise Probit Model (Male Employees)

	1-digit		2-digit	
	dF/dx	z-stat.	dF/dx	z-stat.
Trade Unions				
Union	.201	11.29	.201	11.27
Human Capital				
Ten/10	.033	0.51	.068	1.05
$(Ten/10)^2$	-.014	-0.29	-.042	-0.88
$(Ten/10)^3$	.002	0.24	.008	0.83
Exp	-.012	-3.19	-.011	-3.20
Exp^2	1.45e-04	1.89	1.37e-04	1.85
IndExp	-.017	-2.89	-.020	-3.52
$IndExp^2$	.001	3.66	.001	3.53
$IndExp^3$	2.61e-05	-3.87	-2.59e-05	-3.38
Occexp	.012	2.22	.007	1.22
$Occexp^2$	-9.12e-04	-2.44	-3.67e-04	-.092
$Occexp^3$	1.56e-05	2.31	4.80e-06	0.64
Leave	-.007	-1.89	-.006	-1.67
Region				
London	-.012	-0.40	-.007	-0.26
North	-.074	-3.59	-.079	-3.83
Midlands	-.068	-3.20	-.068	-3.24
Wales	-.057	-1.51	-.062	-1.65
Scotland	-.034	-1.13	-.038	-1.24

(*Table 6* continued).

Industry Sector				
SIC 2	-.099	-2.17	-.099	-2.17
SIC 3	-.203	-5.52	-.201	-5.48
SIC 4	-.144	-3.77	-.140	-3.68
SIC 5	-.073	-1.57	-.077	-1.67
SIC 6	-.122	-3.02	-.128	-3.15
SIC 7	-.171	-4.32	-.174	-4.40
SIC 8	-.192	-4.83	-.197	-4.98
SIC 9	.049	1.28	.047	1.24
Firm Size (ascending)				
Firm Size 2	.043	0.51	.042	0.49
Firm Size 3	.031	1.15	.029	1.09
Firm Size 4	.077	2.88	.078	2.92
Firm Size 5	.071	2.60	.070	2.57
Firm Size 6	.116	4.57	.117	4.59
Firm Size 7	.148	4.91	.151	5.01
Firm Size 8	.183	6.27	.183	6.28
Occupation				
SOC 2	.174	5.47	.158	4.93
SOC 3	.064	1.66	.052	1.34
SOC 4	.005	0.12	-.015	-0.33
SOC 5	-.055	-1.05	-.072	-1.39
SOC 6	.003	0.07	-.006	-0.13
SOC 7	-.005	-0.10	-.018	-0.36
SOC 8	-.053	-1.02	-.074	-1.45
SOC 9	.037	0.60	.021	0.34
Skills				
Semi-Skilled	.079	1.38	.089	1.55
High-Skilled	.080	1.28	.078	1.24
Foreman	.077	1.24	.076	1.23
Non-Manual	.135	2.10	.137	2.15
Prmg	.043	0.62	.048	0.69
Qualifications				
High-Degree	-.186	-3.52	-.201	-3.84
First-Degree	-.062	-1.53	-.070	-1.72
Teaching Qual.	.006	0.10	.012	0.20
Higher Qual.	-.026	-0.97	-.029	-1.07
Nursing Qual.	.101	0.69	.120	0.82
A-Level	-.021	-0.68	-.026	-0.83
O-Level	-.048	-1.78	-.049	-1.79
Commql	-.025	-0.23	-.028	-0.25
CSE	-.155	-4.15	-.154	-4.13
Apprent	.066	1.29	.063	1.24
Other Qual.	.045	0.56	.047	0.59
Time Trend				
Wave	-.021	-5.94	-.020	-5.70
Sample	5013			

Notes: Derived marginal effects.

Table 7

	Union		Non-Union	
Earnings, Unionism & Seniority Scales				
	1-dgt	2-dgt	1-dgt	2-dgt
Pay-Rise				
T10	.059 (.029)	.064 (.030)	.083 (.064)	.045 (.064)
Exp10	.135 (.029)	.157 (.028)	.310 (.063)	.290 (.059)
Ind10	-4.67e-04 (.032)	.002 (.029)	.050 (.061)	.143 (.057)
Occ10	.033 (.028)	.025 (.027)	.137 (.058)	.073 (.056)
rho	.127 (.145)	.102 (.152)	.725 (.069)	.726 (.072)
LR test (X²)	0.57	0.35	12.87	11.78
Sample	1670		563	
No Pay-Rise				
T10	.004 (.035)	.002 (.036)	-.055 (.042)	-.070 (.042)
Exp10	.247 (.036)	.249 (.035)	.141 (.041)	.169 (.039)
Ind10	.011 (.033)	.001 (.031)	-.029 (.038)	.010 (.035)
Occ10	.020 (.031)	.011 (.029)	.169 (.036)	.119 (.036)
rho	-.139 (.116)	-.131 (.116)	.511 (.108)	.573 (.089)
LR test (X²)	1.26	1.13	6.32	8.49
Sample	1292		1488	

Notes: Standard errors into brackets.

Figure 1
Political Beliefs and Unionism†

Labour

Liberal Democrats

Conservatives
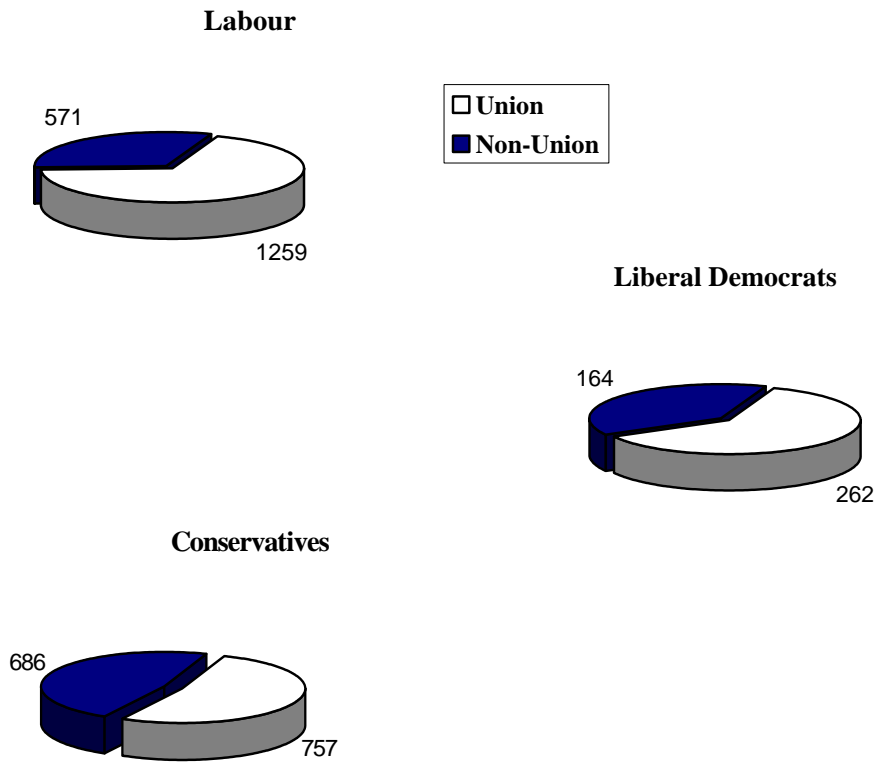
†: Distribution of individuals between union and non-union jobs based on their political views.

Appendix

Table A.1

	Industry Classification (1-digit)
SIC1	Agriculture, Forestry & Fishing; Energy & Water Supplies
SIC2	Extraction of Minerals & Ores (other than fuels); Manufacture of Metals, Mineral Products & Chemicals
SIC3	Metal Goods, Engineering & Vehicles Industries
SIC4	Other Manufacturing Industries
SIC5	Construction
SIC6	Distribution, Hotels & Catering (Repairs)
SIC7	Transport & Communication
SIC8	Banking, Finance, Insurance, Business Services & Leasing
SIC9	Other Services

Table A.2

	Occupational Classification (1-digit)
SOC1	Managers & Administrators
SOC2	Professional Occupations
SOC3	Associate Professional & Technical Occupations
SOC4	Clerical & Secretarial Occupations
SOC5	Craft & Related Occupations
SOC6	Personal & Protective Service Occupations
SOC7	Sales Occupations
SOC8	Plant & Machine Operatives
SOC9	Other Occupations