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Abstract: We investigate the relationship between the cost of procuring adequate worker effort over time and the shape of workers' experience-earnings profiles. In particular, we argue that the slope of the profile depends critically upon the degree of 'equity' held by workers in their enterprise as measured by the extent of performance related pay (*PRP*). The implication is that the slope of the profile for *PRP* workers falls between those of their zero-equity fixed wage, and one hundred per cent equity self-employed, counterparts. Our empirical analysis of three British data sets, namely the *British Social Attitudes Survey*, the *British Household Panel Survey* and the *British Family Expenditure Survey*, supports this prior.

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JEL Classification: J23, J24, J33.

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I.   Introduction

The relationship between the nature of the employment contract and worker productivity has long intrigued economists. Particular, but somewhat disjoint, emphasis has recently focused upon the implications of fixed wage, performance related pay (*PRP*), and self-employment (*sic*) contracts. The efficiency wage hypothesis, for example, has examined the notion that the firm's production costs might be inversely related to the level of pay and, in so doing, has proffered an explanation for equilibrium unemployment.[1] The analysis of self-employment has focused on its potential as a means of alleviating unemployment [Taylor (1996), Bernhardt (1994), de Wit (1993), Fujii and Hawley (1991), Rees and Shah (1986)]. Perhaps most controversial of all has been the academic and popular interest in *PRP*. Re-kindled by Weitzman's (1985, 1987) purported macroeconomic benefits of profit sharing, attention has turned towards the more readily discernible, and originally lauded, microeconomic benefits of *PRP* schemes broadly defined [see Weitzman and Kruse (1990), Blinder (1990)].

We contribute to an improved understanding of these issues by focusing on the shape of the experience-earnings profile for workers employed under each type of contract. We follow Lazear (1979) in hypothesising that the slope of this profile reflects agency costs, and the reduction thereof, with increased agency costs inducing steeper profiles. The divergence of interests and asymmetry of information between principal and agent may cause output to depend upon the contingent nature of the compensation contract. If the costs of monitoring worker performance are excessive, firms may introduce compensation schemes, which encourage workers to self-select behaviour in the firms' interests. One method of doing this is to defer a substantial component of compensation until the later years of tenure. Such a wage profile would provide a penalty for shirking and thereby encourage workers to work efficiently over their employment-cycle. Intuitively, by paying younger workers less than their marginal product, and older workers conversely more, the firm is able to keep the

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present value of wages equal to the present value of productivity. This provides incentives to workers that would be absent if they were to be paid a wage that more closely followed productivity over their employment-cycle.

We therefore presume that the profiles of workers employed under fixed wage 'salaried' contracts are steeper than those of self-employed workers for whom the issue of agency does not arise. The interesting case is that of workers employed under a *PRP* contract. If, as we propose, such contracts represent a hybrid between salaried and self-employment, then one would expect their experience-earnings profiles to lie somewhere between the two extreme cases. If such a hypothesis is correct then it casts new light on the nature of the experience-earnings profile, suggesting that the profile reflects agency costs, and the reduction thereof. Moreover, it may help to illuminate a hitherto neglected conduit for the transmission of productivity benefits under collective *PRP* schemes such as profit sharing: *ceteris paribus*, the same experience-earnings profile would inspire relatively less shirking under a profit-sharing as compared to a salaried contract on account of the lower degree of agency considerations that must be overcome. Alternatively, the same degree of effort may be obtained from risk averse workers via a flatter, and therefore less expensive, earnings profile.

The nature of the profile has important implications for labour market behaviour. If the slope is primarily a reflection of human capital considerations, then it offers some clue as to the return to on-the-job training and educational investments. If agency considerations are paramount then it raises issues concerning the credibility of long-term employment contracts - firms may have an incentive to fire 'older' expensive, but no more productive, workers. A time-consistency problem may arise, with particular firms unable to recruit younger, less experienced applicants because of their inability to commit not to dismiss them in the future. If the profile, however reflects training, such an incentive-compatibility problem will not arise - older workers will be more productive *ceteris paribus*. The nature of the earnings

profile may also impinge upon quitting behaviour. More experienced 'generally' trained workers will have more manoeuvrability in the labour market than their otherwise similar 'firm-specifically' trained counterparts. But both types may have more options than those older workers whose market rents are primarily a reflection of agency considerations.

The paper is set out as follows: Section II reviews previous work into the nature of the experience-earnings profile. Our empirical investigations are set out in Sections III and IV whilst final comments are collected in Section V.

II.   Background

The positive correlation between experience and earnings is one of the most robust and uncontentious findings in labour economics.[2] The source of the relationship, however, is somewhat opaque and in recent years two key theoretical explanations have emerged.[3] First, the general human capital model posits that workers become more productive, and hence better remunerated, on account of investments in human capital or training. Training investments can be either of a general, readily transferable variety or of a specific, non-transferable variety, both of which increase a worker's productivity over time in the current firm. The human capital thesis suggests that it is the return to this investment, with initial relatively low and subsequent relatively high real wages, which causes the earnings profile to have an upward slope [Becker (1975), Ben-Porath (1967), Mincer (1958, 1974)]. Wage growth is therefore equivalent to the return to investment in on-the-job training plus the change (i.e. reduction) in the investment from period to period minus any depreciation of the stock of human capital. Larger amounts of on-the-job training will result in steeper wage profiles.[4]

The second explanation is grounded in the theory of agency. It has long been observed that worker productivity is inexorably linked to the form of the compensation scheme [see Mitchell *et al* (1990)]. From the early work of Johnson (1950), Cheung (1969)

and Ross (1973), a recurring theme of this literature is that the divergence of interests and asymmetry of information between principal and agent cause output to depend upon the contingent nature of the compensation contract. The prohibitive cost of monitoring worker performance necessitates compensation schemes, which encourage workers to self-select behaviour the firm considers to be optimal. One method of doing this is to defer a substantial component of compensation until the later years of tenure. Such a wage profile provides a penalty for shirking and thereby encourages workers to work efficiently over their employment-cycle. Intuitively, by paying younger workers less than their marginal product, and older workers conversely more, the firm is able to keep the present value of wages equal to the present value of productivity. This provides incentives to workers that would be absent if they were to be paid a wage that more closely followed productivity over their employment-cycle. Essentially, steep profiles provide *ex post* rents that the worker is reluctant to lose. If reducing effort increases the probability of involuntary termination, then steep profiles increase the cost of shirking, thereby encouraging workers to raise their effort level, and in this sense represent a form of efficiency wage payment [Lazear (1979, 1981)].

Much of the existing research testing the competing hypotheses considers whether or not wage increases are closely positively correlated with productivity increases [see, for example, Medoff and Abraham (1981), Brown (1989), Kotlikoff and Gokhale (1992), Hellerstein and Neumark (1995)].[5] Some of the studies that have tested this relationship empirically, however, have found wage profiles to be steeper than measures of productivity growth.[6] Medoff and Abraham (1980) found that, within job categories wages tended to rise over time whilst supervisor performance evaluations (a proxy for productivity) were relatively flat.[7] Taking a somewhat different approach, Frank and Hutchens (1988) showed that, even in professions such as airline pilots and inter-city bus drivers where productivity would seem to be relatively static, workers receive wages that rise substantially with tenure. Similar findings were obtained in an earlier study of 'accelerating obsolescence of older

engineers' [Dalton and Thompson (1971)]. Also consistent with the notion that wages rise faster than productivity is the finding of a so-called 'tenure effect' [Mincer and Jovanovic (1981)] - the observation that wages within a firm rise relative to alternatives as job seniority rises.[8]

There are several reasons why wage growth might outstrip productivity growth. Deferred compensation may deter shirking by raising the monetary consequences to a worker of being fired [Lazear (1981)]. Alternatively, deferred wages may serve as a self-selection device to discourage workers with high quit propensities from joining the firm [Salop and Salop (1976)]. Other explanations rely on the assumption that workers are more risk averse than the firm they work for [Harris and Holmstrom (1982)] or that firms can earn a higher rate of return on assets than workers. In the latter view, firms invest a fraction of workers' wages early in their careers and dole out the returns in the form of deferred wages.

An insightful method of discriminating between the human capital and agency explanation has been posited by Lazear and Moore (1984) who focus on empirical evidence regarding the relative 'flatness' of self-employed workers age-earnings profiles [Wolpin (1974), Fuchs (1981)]. Such a finding would seem to be problematic given that investment in physical capital depresses observed wages for the young self-employed, whilst the later returns to that investment raise observed wages. Both factors would tend to steepen experience earnings profiles for the self employed *vis a vis* wage and salary workers.

Lazear and Moore (1984) rationalise this finding by highlighting the defining nature of self-employment, namely the duality of principal and ownership. Such an arrangement eliminates any disharmony of interests and so removes the necessity of engendering efficient effort over the life cycle through the use of a positively sloped wage profile. Observed profiles, argue Lazear and Moore (1984), are a reflection of the disharmony of interests prevalent in the employment relation that are, by definition, absent from self-employment. By increasing the slope of the profile employers are able to induce their employees to work

harder, therefore raising the present value of the latter's lifetime earnings. The self-employed require no such internal incentive mechanism and thus, may be used as a control to test the theoretical prediction that the shape of the experience-earnings profile is determined primarily by agency as opposed to human capital considerations.

In what follows we generalise Lazear and Moore's analysis by focusing not only on salaried and self-employed workers, but also on workers who receive some element of *PRP*. Our presumption is that the employment contracts of all three worker types can be nested in the form:

$$w_j = \left(1 - \lambda_j\right)\overline{w} + \lambda_j f\left(e;\theta\right) \tag{1}$$

where $j = s, prp, se$ denotes 'salaried', '*PRP*' and 'self-employment' employment respectively. w_j denotes total remuneration, $\overline{w}$ the component of total remuneration that is 'fixed' (i.e. independent of worker performance), and $f\left(e;\theta\right)$ some function mapping the relationship between worker performance (i.e. effort), e, 'uncertainty', θ and pay.[9] λ_j represents the degree of equity held by a worker in his/her enterprise, *viz.* the proportion of total remuneration that is dependent upon performance.[10] We presume that $\lambda_s = 0$, $\lambda_{prp} \in (0,1)$, $\lambda_{se} = 1$ such that:

$$w_s = \overline{w} \tag{2}$$

$$w_{prp} = \left(1 - \lambda_{prp}\right)\overline{w} + \lambda_{prp} f\left(e;\theta\right) \tag{3}$$

$$w_{se} = f\left(e;\theta\right) \tag{4}$$

Our presumption is that the shape of the experience-earnings profile depends critically upon λ_j. To be sure, we presume that agency costs decline monotonically with λ_j such that the

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slope of the *PRP* earnings profile falls between the zero-equity, fixed wage and one hundred per cent equity, self-employed profiles.[11] Hence, in this paper we essentially generalise the approach pioneered by Lazear and Moore (1984) in order to allow for the intermediate category of *PRP*, which enables us to further explore the agency explanation behind the positive slope of the experience-earnings profile.

IV.   Data and Methodology

Data

Our empirical analysis draws on three British data sets *vis*. the *British Social Attitudes Surveys* 1985, 1987, 1993 and 1996, the *British Household Panel Surveys* 1991-1999 and the *British Family Expenditure Surveys* 1997/98, 1998/99 and 1999/00.

The *British Social Attitudes Surveys* (*BSAS*) are an annual series of surveys initiated in 1983 by Social and Community Planning Research. The data are derived from a cross-sectional sample of individuals, aged 18 and over, living in private households whose addresses were on the electoral registrar. From the 650 Parliamentary constituencies in Great Britain, 114 were chosen on the basis of the Registrar General's Standard Regions to facilitate the sampling. From each of the constituencies a polling district was randomly selected and addresses were randomly chosen from these districts.

The surveys conducted in 1985, 1987, 1993 and 1996 contained questions relating to the presence of *PRP vis*. whether in the year of interview the respondent had received some component of their total remuneration in the form of: (i) a productivity linked bonus scheme; (ii) an annual bonus (at the employing organisation's discretion); (iii) a share ownership or share option scheme; or (iv) a profit sharing scheme. Individuals who reported that they had participated in any of the four schemes were labelled as *PRP* employees.[12] Selecting out all male respondents in salaried-, *PRP*-, or self-employment with complete records rendered 1467, 783, and 491 individuals respectively.[13]

Our second data set is based on the *British Household Panel Survey* (*BHPS*), 1991 - 1999. This is a random sample survey carried out by the Institute for Social and Economic Research of each adult member of a nationally representative sample of more than 5,000 private households (yielding approximately 10,000 individual interviews). For Wave one, interviews were conducted during the autumn of 1991. The same individuals are re-interviewed in successive waves – the latest being wave twelve. The main objective of the *BHPS* is to further understanding of social and economic change at the individual and household level in Britain.

We explore data from the 1991-1999 surveys. In the first wave (1991), all individuals are asked whether their pay includes bonuses or profit sharing thereby enabling us to identify *PRP* employees. For the period, 1992-1995, this question is only asked to individuals who change their job. We therefore assume that individuals who do not change job remain in their 1991 employment type. We specify an unbalanced panel of data whereby the minimum number of times an individual is in the sample is one and the maximum is nine. Our sample comprises 4,594 fixed wage employees, 2,806 *PRP* employees and 1153 self-employees.

Our third data set is drawn from the *Family Expenditure Survey* (*FES*) for Great Britain, which is a nationally representative survey that has been conducted on an annual basis since 1957. Some 10,000 households are selected each year to take part in the *FES*, and the average response rate is approximately 70%. The main aim of the survey is to provide a reliable source of information on household expenditure, income and other aspects of household finances. To account for seasonal differences in expenditure, face-to-face interviews are spread evenly over the year. Each individual aged 16 or over in the households visited is asked to keep diary records of daily expenditure for two weeks. Respondents are also asked to complete an income questionnaire.

We use data from the 1997-1998, 1998-1999, and 1999-2000 surveys.[14] Our sub-sample comprises working males aged between 18 and 65 who are either self-employed or

employed under a fixed wage contract or a contract characterised by *PRP*. Those individuals classified as being employed under a *PRP* contract were those in receipt of a productivity linked bonus, profit-related pay, dividends from employee share ownership, an incentive bonus or a performance related bonus. Our sample consists of 8405 male respondents comprising 5965 fixed wage employees, 1201 *PRP* employees and 1239 self-employees.

It is apparent that there is some tension between our theoretical and empirical definitions of *PRP*. The former defines *PRP* as any contract in which current pay is related to current performance broadly defined. Some jobs reward performance with a promotion and/or a salary increment rather than with an explicit bonus. Moreover, some bonus schemes may also be used to identify 'fast-track' employees, and as such a revelatory component may be in operation as the employer learns more about a worker's skills and ability in the early years following an initial hire.[15] The *BHPS*, but not the *BSAS* or *FES*, asks specific questions relating to promotions and salary increments in each year, and we therefore augment our *BHPS* empirical analysis by including dummy variables to control for these factors.[16]

The empirical definitions of *PRP* in the three data sets are quite explicit. The *BSAS* and *FES* adopt a similarly broad definition that includes productivity-linked and discretionary bonuses, share ownership /options, and profit sharing. The *BHPS* focuses on just bonuses (type not defined) and profit sharing.[17] Which definition is more appropriate is largely a matter of interpretation, but our results are broadly consistent across the three data sets, and were not found to be significantly affected by the exclusion of share option / ownership from the *BSAS* and *FES* definitions.

Full sample statistics for each of the data sets are set out in Tables 1 to 3 (all tables are presented in the Appendix).[18] A common finding in all three data sets is the relatively low earnings of self-employed respondents. The problems of accurately measuring self-employment pay are well documented [see Eardley and Corden (1996)]. What is important in our analysis, however, is the consistency in reported self-employment earnings. Since we are

interested primarily in the slope of the experience-earnings profile, measurement error is not too problematic if self-employment income is consistently under-reported by respondents.

Methodology

Our analysis is based on a Mincerian earnings equation of the form:

$$\ln w_{ijt} = X_{ijt}B_j + \alpha_j E_{ijt} + \beta_j E_{ijt}^2 + \varepsilon_{ijt} \tag{5}$$

where w_{ijt} represents the hourly earnings of an individual i employed in employment type j at time t, with $j = s, prp, se$ representing the three employment categories.[19] $\mathbf{X}_{ijt}$ represents a vector of personal and workplace characteristics including education, occupational status and industrial affiliation, whilst E_{ijt} denotes labour force experience at time t, proxied by the respondent's age at time t less his/her age when they completed full-time education.[20]

It is apparent that a first-best estimation of (5) would utilise a panel data source. We adopt such an approach with the *BHPS* sample which follows the same individuals across 1991 to 1999. In the case of the *BSAS* and *FES* analysis we are obliged to utilise pooled cross sectional data. This is not too problematic - if we assume that the vector of personal / workplace characteristics is stable across time then $\mathbf{X}_{ijt} = \mathbf{X}_{ij}$, $\forall t$, and the shape of the earnings profile may be calculated as:

$$\frac{\partial \ln w_{ijt}}{\partial \ln E_{ijt}} = \alpha_j + 2\beta_j E_{ijt} \tag{6}$$

There remain, however, two key problems with estimating earnings profiles from cross sectional data. First, the job matching hypothesis suggests that tenure will be relatively long, and earnings relatively high, where a good match has been struck between employer and employee [Jovanovic (1979)]. The quality of any match will only become known over time and where job match quality is high it will be in the interests of both parties to maintain the

employment contract. This may oblige the firm to pay a wage that minimises employee turnover such that high quality job matches exhibit both relatively high wages and relatively long tenures. Cross-sectional data, allowing only one point of observation in each match length, contains no information about the quality of a job match and may bias any estimates of returns to tenure.

In addition, estimation is further complicated on account of potential sample selection bias. Our earnings data derive from observing a particular employment contract (i.e. salaried, *PRP*, self-employment) and there may be variables that affect both the probability of observing such a contract and the return to any factors in the earnings equation. To take account of such considerations, we control for sample selection bias. Probit analysis with three discrete outcomes is used to model the determination of *Z*, $prob(Z_i = j)$, i.e. the probability of being in one of the three possible types of employment, which is then used to calculate the standard inverse mills ratio term, δ_{ijt}:

$$H_{ijt} = \Phi^{-1}(P_{ijt})$$

$$\delta_{ijt} = \phi(H_{ijt}) / \Phi(H_{ijt})$$

(7)

where P_{ijt} denotes the predicted probability of individual *i* at time *t* being employed under contract type *j*, $\phi(.)$ represents the probability density function of the standard normal distribution, and $\Phi(.)$ represents the cumulative density function of the standard normal distribution. By incorporating δ_{ijt} into the wage regression, we are controlling for the fact that particular types of individuals are likely to be employed under specific types of employment contract.

To explore the robustness of our findings we experimented with three alternative measures of labour market experience. Firstly, for all three of our data sets, we estimated age-

earnings profiles. Secondly, for the *BSAS* sample only (such information is not available in the *BHPS* or *FES* data sets) we estimated employer tenure-earnings profiles for fixed wage and *PRP* employees, making use of the question asked in 1993 and 1996: '*How long have you been continuously employed by your present employer?*' And finally, for the *BHPS* sample only, we estimated job tenure-earnings profiles, making use of following question: '*What was the date you started working in your present position? If you have been promoted or changed grades, please give me the date of that change. Otherwise please give me the date when you started doing the job you are doing now for your present employer.*' This question is asked to all employed respondents, whilst all self-employed respondents were asked '*On what date did you start doing your present job, by that I mean the beginning of your current spell of doing the work you are doing now on a self-employed basis*?' Thus, the responses to both questions are used to calculate current job tenure for employees and self-employees.

IV. Results

We estimate a standard quadratic Mincerian wage equation as depicted by equations (5) and (7). In the case of the cross-section data, we employ standard *OLS* techniques whilst in the case of the panel data derived from the *BHPS* we have employed a random effects estimator.[21] We have experimented with a number of combinations of explanatory variables as well as changes to our set of over-identifying instruments in the selectivity equation and we have found the regressions to be generally well specified and highly robust.[22] In general, our findings accord with the previous literature. For example, our results suggest a generally positive relationship between earnings and education as well as a concave relationship between earnings and experience. For brevity, we present in Tables 4 to 8 only one specification, which includes both educational certificates and years of education.[23] Table 4 presents the results relating to the pooled cross-section analysis of the *BSAS* whilst Table 5

presents the 1991-1999 panel data analysis of the *BHPS*. Finally, Table 6 presents the pooled cross-section analysis of the *FES*.

It is apparent from our three samples that the least robust regressions are those for self-employed respondents. This is not surprising. Such workers will not be motivated by Mincerian type arguments to the same extent as their employed counterparts and, under an (extreme) argument whereby the earnings profile is a reflection of agency issues *only*, would not face the necessity of rewarding themselves with an upward sloping profile to ensure efficient effort over their life cycle.

The selectivity terms suggest that sample selection bias is negative in the *BSAS* salaried and *PRP* regressions, positive in the *BSAS* self-employment regression, positive in the *FES* salaried regression, negative in the *FES PRP* and self-employment regressions, negative in the *BHPS* fixed wage sample, and positive in the *BHPS PRP* sample. Ignoring selectively issues would have therefore led to significant bias in the estimated coefficients.

It is apparent from Tables 4-6 that the estimated coefficients on the various labour force experience proxies (i.e. *Age*, *Years in Labour Force*, *Job-Tenure and Employer-Tenure*) support our theoretical prior that the slope of the earnings profile for *PRP* workers lies between those of their salaried and self-employed counterparts. In terms of the *BSAS* and *FES* data (Tables 4 and 6), the three profiles are significantly different from one other at the one-per cent level of significance irrespective of the experience proxy used. In terms of the *BHPS* data (Table 5), the three profiles are significantly different from one another at the one per cent level of significance when experience is proxied by age or job tenure, whilst the profiles associated with *PRP* and self-employment and fixed wage and self employment (but not fixed wage and *PRP*) are significantly different from each other at the one per cent level when experience is proxied by years in the labour force.

Our *BHPS* results also highlight the positive relationship between the dummy variable recording whether the respondent had been promoted in the current year (*Promotion*) and the

earnings of fixed wage and *PRP* workers, and between the existence of incremental pay scales at the respondent's place of work (*Annual Increment*) and the earnings of *PRP* workers. We experimented with interacting *Annual Increment* and *Promotion* with the various experience proxies. These results confirm the validity of our findings regarding the experience-earnings profiles.[24] Moreover, in the case of the *Promotion* variable, they also cast additional light on the roles played by human capital and agency. Interacting the various experience proxies with *Promotion* suggested that the ordering of the three profiles was not affected by whether respondents had enjoyed a promotion in the current year. Indeed, we found that the difference in the three slopes (i.e. the agency effect) was actually more pronounced for those periods that fell in between promotions. Such findings support the argument that human capital may be more relevant to obtaining promotions whilst agency effects appear to operate primarily between promotions.[25]

Lambda as a Continuous Variable

The *FES* and the *BHPS* (1997-1999) record the total amount of remuneration received in the form of the bonus. We are therefore able to proxy the size of the sharing coefficient, lambda. To be sure, our theoretical priors specified expected remuneration under the general form of the employment contract as:

$$w = (1-\lambda)\bar{w} + \lambda f(e;\theta) \tag{8}$$

Thus total remuneration is split into a fixed and variable component, the division depending on the size of the sharing coefficient λ. We can proxy λ by calculating the ratio of bonus to total pay *vis*:

$$\tilde{\lambda} = \frac{Bonus\ Pay}{Total\ Pay} = \frac{\lambda f(e;\theta)}{(1-\lambda)\bar{w} + \lambda f(e;\theta)} \tag{9}$$

with:

$$\lim_{\lambda \to 0} \tilde{\lambda} = 0 \qquad\qquad (10)$$

$$\lim_{\lambda \to 1} \tilde{\lambda} = 1 \qquad\qquad (11)$$

Sample statistics for both the *FES* and *BHPS* samples relating to $\tilde{\lambda}$ are set out in Table 7.

Our prior is that a higher value of $\tilde{\lambda}$ raises the expected cost of early-term shirking on the part of the worker and thereby leads to a flattening of his/her experience-earnings profile. To investigate this empirically we ran three earnings regressions pooling the self-employed, the *PRP* employees and the fixed wage employees together for each of the two data sets, i.e. the *FES* data and the *BHPS* data - see Tables 8 and 9 respectively. In the case of the *FES,* we conduct *OLS* analysis whilst in the case of the *BHPS* we adopt a random effects approach given that we are able to exploit the panel element to the data, i.e. we have information about the same individuals at potentially three different points in time. Once again, an unbalanced panel approach is adopted whereby the minimum (maximum) number of times an individual is in the sample is one (three).

Specification (1) illustrates that higher values of $\tilde{\lambda}$ are associated with significantly lower earnings - this effect is probably reflecting the presence of self-employed workers within our sample. Specifications (2) and (3) focussed on the interaction between experience and the value of $\tilde{\lambda}$. Our results suggest that higher levels of sharing are indeed associated with a flattening of the experience-earnings profile. In the case of the *FES*, our findings suggest that as the coefficient of sharing moves from zero to unity, the annual rate of return (in terms of log hourly earnings) to an additional year of labour market experience falls from just under five percent to less than one per cent.

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To summarise, our findings related to the proxy of $\tilde{\lambda}$ provide further support for the hypothesis that the slope of the experience-earnings profile is influenced by both the presence and extent of *PRP*.

Training

Our results would seem to support the hypothesis that experience-earnings profiles do reflect agency considerations, with *PRP* profiles generally lying somewhere between salaried and self-employed profiles. Furthermore, we would argue that our findings are relatively robust given that we have used three different data sets (including both cross-section and panel data) as well as exploring our theoretical priors via two different approaches and exploring alternative measures of experience. In addition, we would argue that the intuition related to the agency explanation behind the relative ranking of the slopes of the experience-earnings profiles is clear. However, it is also apparent that an alternative argument can be offered. It may be the case that *PRP* workers undertake relatively less training than their salaried counterparts, implying relatively high (low) starting (future) earnings, and thus flatter profiles. It is difficult to rationalise such an argument - it might seem that workers remunerated under *PRP* are, if anything, more likely to respond to investments in training than their salaried counterparts. To investigate this possibility we investigated the relative likelihood of salaried and *PRP* respondents having undertaken some form of training at their place of work. Two of our three data sets (*BSAS* and *BHPS*) contained information regarding whether respondents had received training within their firm.

The *BSAS* survey for 1987 asked respondents, in the two years preceding the survey interview, whether they had been: (i) asked to do anything just for practice in order to learn the work; (ii) given any special talks or lectures about the work; (iii) placed with more experienced people to see how the work should be done; (iv) sent around to different parts of the organisation to see how the work is done; (v) asked to read things to help learn about the

work; (vi) taught or trained by anyone whilst actually doing the work; (vii) sent on any courses to introduce new methods of working. We created two variables – a dummy variable ('*Train*') which takes the value of one if the respondent answered 'yes' to any of these questions and an index ('*Trains*') which equals the number of these questions to which the respondent had answered 'yes' to the various types of training. Thus, *'Train'* represents a binary dummy variable indicating whether or not an individual has received any training, whilst *'Trains'* represents an index, which ranges from 0 to 7 indicating the number of types of training undertaken. We are therefore able to focus on both the incidence (*'Train'*) and intensity of training (*'Trains'*).

Participants in the *BHPS* were asked a somewhat less detailed question than their *BSAS* counterparts, simply whether in the preceding year they had participated in any off-the-job education or training. Relevant summary statistics for these variables for both data sets are set out in Table 10. Given that our focus is on the incidence of training at relatively low levels of experience, we present summary statistics for four levels of experience. In the case of the *BSAS* sample, it appears that *PRP* employees do receive less training than their fixed wage counterparts. This finding may be taken as support for the evidence of a training effect. The situation is reversed, however, at the lowest category of experience, which arguably is the focus of our attention. In the case of the *BHPS* samples, the support for the training explanation is less clear-cut with *PRP* employees, in general, being characterised by a higher incidence of training.

We explore the incidence and intensity of training across *PRP* and fixed wage employees by conducting probit analysis (dependent variable – *Train*) and ordered probit analysis (dependent variable – *Trains*). Our findings are set out in Table 11. It is apparent that in the case of the *BSAS*, the *PRP* dummy variable has no effect on the probability that the respondent had so engaged in training. The probability of training was, however, significantly negatively related to the respondent's experience in the labour market, perhaps

reflecting the fact that most training is undertaken by relatively younger workers. To ascertain whether there was any interaction between such experience and the *PRP* dummy we ran a second specification of the dichotomous and ordered probit models, this time including a series of experience-*PRP* interactions terms *vis*. 'Experience less than five years*PRP'; 'Experience more than five years but less than ten years*PRP'; 'Experience more than ten years but less than twenty years*PRP'; 'Experience more than twenty years*PRP'. The coefficients on these terms were insignificant in the dichotomous probit but those on the last three were significantly negative in the ordered probit. Thus it does appear that more experienced workers receive relatively less training than their non-*PRP* counterparts, *ceteris paribus*. It should be noted, however, that we are primarily interested in the incidence of training at the lower level of experience.

We repeated this analysis for the *BHPS* sample. In the case of the panel data set, the results from employing a random effects probit estimator suggest that *PRP* employees are more likely to receive training, which provides evidence contrary to the training explanation.

Our results are therefore somewhat mixed and the *BSAS* findings allude to the possibility that differences in the earning-experience profile may not be driven solely by agency consideration. But these findings are not reflected in the *BHPS* data.

V.   Final Comments

This paper has focused on the relationship between experience-earnings profiles and the degree of worker equity within an enterprise. We extend Lazear and Moore's (1984) thesis that the nature of the profile is primarily a reflection of agency considerations by focusing not only on those workers with zero or one hundred per cent equity (i.e. salaried and self-employed workers respectively), but also on those with a fractional level of equity *vis*. workers remunerated under some form of *PRP*. Our presumption is that these latter face an

intermediate level of agency costs and as such require an intermediate profile. Our empirical analysis of three British data sets offers some support for this view.

Our results might be interpreted as support for the argument that the shape of the experience-earnings profile is primarily a reflection of the costs of agency rather than of the accumulation of human capital through on-the-job training. As such, they highlight important issues pertaining to the credibility of long-term employment contracts, since employers may be tempted to replace experienced workers with less costly, but equally productive, novices. But the latter will not remain 'young' forever, and whether they will be inclined to work for a firm that is unable to guarantee them employment in their dotage is an open question.

Moreover, our findings may help to illuminate a hitherto neglected conduit for the transmission of productivity benefits under collective *PRP* schemes such as profit sharing: if capital markets are imperfect then the same experience-earnings profile would inspire relatively less shirking under a profit-sharing as compared to a salaried contract on account of the lower degree of agency considerations that must be overcome. Alternatively, the same degree of effort may be obtained from risk averse workers *via* a flatter, and therefore less expensive, earnings profile.

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Endnotes

[1] See Akerlof and Yellen (1986), Weiss (1991) and Carmichael (1990) for extensive reviews of the microeconomic foundations under-pinning efficiency wage models.

[2] For an extensive survey of the literature see Polachek and Siebert (1992).

[3] Recent work in this area has emphasised the plausibility of other explanations. For example, search models generally predict that more time in the labour marker increases the chance of finding a better match and thus tends to be associated with higher earnings [Burdett (1978), Ruhm (1991), Jacobson and LaLonde (1993), Manning (1997)]. Alternatively, workers may prefer rising earnings profiles as a form of forced saving [Loewenstein and Sicherman (1991), Frank and Hutchens (1993)].

[4] The introduction of labour-fixed costs or firm specific human capital [Becker (1975)] partially qualifies these predictions. Since investment in firm-specific human capital is assumed to be shared by the worker and the firm, the resulting wage profile will be flatter than the path of productivity such that wage profiles will be either equivalent to, or flatter than, productivity growth over the life cycle [Hashimoto and Yu (1980)].

[5] Implications of specific human capital investment are ambiguous. Becker (1975) argues that such investment implies that wages grow slower than marginal products. Blinder (1981) and Carmichael (1983), however, develop specific human capital models in which wages grow faster than marginal products. Some implications of the forced saving model are similar to those of Lazear's model, since workers are paid less than their marginal products when young and more when old.

[6] Estimating the actual relationship between wages and productivity growth is problematic since productivity cannot in general be measured directly. Hence, most studies rely on indirect measures of productivity, limit the analysis to specific jobs, or ignore promotions and turnover.

[7] This approach was later criticised by Weiss and Landau (1985) who argued that the correlation between wages and productivity within a job category would be attenuated if productivity were used as a criterion for promotion.

[8] The tenure effect has been the focus of controversy. A number of economists have argued that the observed seniority premium is a statistical artefact [see, for example, Abraham and Farber (1987), Altonji and Shakotko (1987), Marshall and Zarkin (1987)] whilst others have found the effect to be substantial and significant [see, for example, Topel (1990)].

[9] Uncertainty may be related, for example, to conditions in the output market.

[10] We assume in what follows that the extent of worker equity, as measured by λ, is exogenous being fixed by custom or government directive. This is obviously a simplistic assumption and a fuller exposition would seek to explain the distribution of different contractual arrangements.

[11] Equation (3) defines *PRP* as any contract in which current pay is related to worker performance broadly defined. The practical operation of such schemes is certainly more nuanced - see, for example, Blinder (1990), Booth and Frank (1999).

[12] Clearly, the four schemes are diverse in nature and as such create different incentives. Ideally, we would classify individuals according to the type of *PRP* scheme. Such an approach would be somewhat problematic, however, due to the low number of observations in each scheme.

[13] In order to abstract from issues related to labour market participation, throughout our analysis we focus on male employees only.

[14] Prior to this period the dataset had a slightly different structure and some of the variables required for our analysis are not available.

[15] We are grateful to an anonymous referee for highlighting this point.

[16] The specific questions are: *Promotion* – What was the date you started working in your present position? If you have been promoted or changed grades, please give me the date of that change. Otherwise please give me the date when you started doing the job you are doing now for your present employer; *Annual Increment* – 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? Zero-one dummy variables were created from both of these questions – see Table 5, Note 2 for details.

[17] There is also some distinction between the *BSAS / FES* and *BHPS* definitions of self-employment. In the *BSAS* and *FES*, individuals are categorised according to the following question: '*In your main job, are you an employee or a self-employee?*' In the *BHPS*, individuals are asked to specify their current labour force status , with options including 'paid-employment', 'self-employment,' 'unemployed', 'retired', 'on maternity leave', 'in family care', 'full-time student', 'long term sick / disabled', 'on a government training schemes', 'other'.

[18] A small number of individuals with more than one job, individuals employed by the armed forces and agricultural workers were excluded from the analysis of each data set.

[19] The definition of hourly earnings differs across our three data sets according to the survey questions asked of respondents. For the *BHPS*, hourly earnings are defined as labour income in the previous month divided by the number of hours normally worked per month. For the *BSAS*, they are defined as the respondent's gross annual earnings divided by the number of hours the respondent works per week multiplied by 52. For the *FES*, hourly employed earnings are defined as the normal gross weekly wage divided by usual weekly hours whilst hourly self-employed earnings are defined as normal gross income from self-employment divided by usual weekly hours worked

[20] Following Murphy and Welch (1990), we also experimented with cubic and quartic experience terms – the results are available on request.

[21] The fixed effects estimation results are available from the authors by request.

[22] The over-identifying instruments for the underlying sample selection model included region of residence and a variety of demographic controls. The sample selection models, which were estimated using unordered probit analysis with three discrete outcomes, are generally well specified. For reasons of brevity, the sample selection results are not presented here, but are available from the authors on request. The results reported in Tables 4-6 have all been corrected for sample selection bias - uncorrected results are also available on request.

[23] As pointed out by an anonymous referee, the shape of the earnings profiles may be influenced by trade union membership, unionisation of the work place, and employment in the public sector. Our results are robust to the inclusion of such controls.

[24] The results are available on request.

[25] We are grateful to an anonymous referee for highlighting such issues.

Appendix

Table 1: Summary Statistics:
British Social Attitudes Surveys 1985, 1987, 1993, 1996

	Fixed Wage (N = 1467)		PRP (N = 783)		Self-Employed (N = 491)	
Variable	*Mean*	*Std. Dev*	*Mean*	*Std. Dev*	*Mean*	*Std. Dev*
Log Hourly Earnings	1.716	0.619	1.771	0.610	1.613	0.802
Years in Labour Force	21.722	12.694	22.253	12.325	25.193	12.398
Age	38.644	11.902	38.789	11.643	41.433	12.258
Employer Tenure[1]	9.227	11.505	10.757	10.713	-	-
Years of Education	11.941	2.191	11.540	1.885	11.566	1.968
Degree	0.192	0.394	0.102	0.303	0.112	0.316
Further Education	0.179	0.384	0.171	0.377	0.147	0.354
A Level	0.141	0.348	0.160	0.367	0.175	0.380
GCSE Grades A to C	0.197	0.398	0.223	0.417	0.220	0.415
GCSE Grades below C	0.065	0.247	0.089	0.286	0.104	0.305
Other Qualification	0.013	0.113	0.010	0.101	0.016	0.127
1985	0.173	0.378	0.203	0.403	0.136	0.344
1987	0.265	0.442	0.340	0.474	0.242	0.429
1993	0.247	0.432	0.169	0.375	0.289	0.454
1996	0.314	0.464	0.289	0.453	0.332	0.471
Professional	0.449	0.498	0.383	0.486	0.236	0.425
Other Non Manual	0.082	0.274	0.093	0.291	0.747	0.435
Skilled Manual	0.270	0.444	0.298	0.457	0.006	0.008
Semi-Skilled Manual	0.106	0.308	0.138	0.345	0.006	0.078
Unskilled Manual	0.030	0.171	0.027	0.162	0.000	0.000
Energy	0.245	0.155	0.066	0.249	0.004	0.064
Metal Extraction	0.018	0.132	0.065	0.247	0.006	0.078
Metal Goods	0.149	0.356	0.166	0.372	0.037	0.188
Other Manufacturing	0.112	0.316	0.133	0.340	0.041	0.198
Construction	0.074	0.261	0.079	0.270	0.338	0.474
Transport & Communications	0.082	0.274	0.120	0.325	0.079	0.271
Banking	0.065	0.246	0.119	0.324	0.088	0.283
Other Services	0.371	0.483	0.128	0.334	0.242	0.429

Notes: 1. Figures relate to 1993 and 1996 only, since this information was only provided in these years.

Table 2: Summary Statistics
British Household Panel Survey 1991-1999

Variable	Fixed Wage (N = 14284)		PRP (N = 6212)		Self-Employed (N = 3716)	
	Mean	Std. D	Mean	Std. D	Mean	Std. D
Log Hourly Earnings	1.926	0.517	2.029	0.515	1.855	0.842
Years in Labour Force	24.820	12.435	23.588	11.754	29.939	11.872
Years of Education	13.224	4.018	13.214	3.485	12.925	3.933
Job Tenure	4.944	6.451	4.468	6.106	8.409	8.544
Age	38.088	11.568	36.830	11.005	42.903	11.078
Annual Increment	0.294	0.455	0.418	0.493	-	-
Promotion	0.053	0.224	0.113	0.316	-	-
Degree	0.177	0.381	0.159	0.366	0.120	0.325
Further Education	0.241	0.428	0.278	0.448	0.249	0.432
A level	0.144	0.351	0.160	0.366	0.126	0.332
GCSE Grades A to C	0.195	0.396	0.206	0.404	0.222	0.416
GCSE Grades below C	0.195	0.396	0.054	0.225	0.044	0.205
Other Qualification	0.035	0.185	0.032	0.176	0.047	0.212
Managerial	0.145	0.352	0.239	0.426	0.194	0.400
Professional	0.115	0.319	0.087	0.282	0.115	0.319
Intermediate Non Manual	0.105	0.307	0.098	0.298	0.109	0.311
Sales	0.035	0.184	0.067	0.251	0.038	0.190
Clerical	0.099	0.299	0.101	0.301	0.005	0.073
Personal Services	0.088	0.283	0.026	0.158	0.013	0.113
Skilled Manual	0.192	0.394	0.173	0.379	0.383	0.486
Semi-Skilled Manual	0.162	0.368	0.153	0.360	0.099	0.300
Unskilled Manual	0.060	0.237	0.056	0.230	0.044	0.204
Energy	0.029	0.168	0.036	0.186	0.003	0.057
Extraction	0.042	0.200	0.070	0.255	0.008	0.088
Engineering	0.144	0.351	0.164	0.370	0.044	0.205
Manufacturing	0.123	0.329	0.116	0.321	0.050	0.217
Construction	0.057	0.232	0.050	0.217	0.312	0.463
Distribution	0.133	0.340	0.189	0.391	0.198	0.398
Transp, Strge & Communication	0.085	0.279	0.102	0.302	0.079	0.270
Finance	0.104	0.306	0.183	0.387	0.155	0.362
Other Non Manufacturing	0.266	0.442	0.075	0.263	0.139	0.346
1991	0.099	0.298	0.137	0.344	0.113	0.317
1992	0.131	0.337	0.035	0.184	0.107	0.309
1993	0.123	0.328	0.035	0.183	0.102	0.303
1994	0.123	0.329	0.037	0.188	0.104	0.305
1995	0.088	0.284	0.118	0.322	0.105	0.307
1996	0.087	0.281	0.134	0.341	0.107	0.310
1997	0.107	0.309	0.149	0.356	0.115	0.319
1998	0.102	0.303	0.153	0.360	0.109	0.312
1999	0.141	0.348	0.203	0.402	0.137	0.344

Table 3: Summary Statistics
Family Expenditure Surveys 1997/98, 1998/99 and 1999/00

Variable	Fixed Wage (N = 5965)		PRP (N = 1201)		Self-Employed (N = 1239)	
	Mean	Std. D	Mean	Std. D	Mean	Std. D
Log Hourly Earnings	2.120	0.564	2.492	0.574	1.601	1.085
Years in Labour Force	22.283	12.413	21.7669	11.247	27.195	11.104
Age	39.644	11.618	39.493	10.376	44.320	10.535
Years of Education	12.361	2.777	12.726	2.735	12.125	2.810
Degree	0.224	0.417	0.277	0.448	0.194	0.395
Further Education/A Level	0.192	0.394	0.216	0.412	0.157	0.364
GCSE	0.365	0.482	0.357	0.479	0.362	0.481
Less than GCSE	0.218	0.413	0.149	0.356	0.287	0.453
1997/98	0.311	0.463	0.373	0.484	0.378	0.485
1998/99	0.337	0.473	0.320	0.467	0.316	0.465
1999/00	0.353	0.478	0.307	0.462	0.307	0.461
Professional	0.088	0.284	0.122	0.327	0.120	0.325
Managerial	0.321	0.467	0.470	0.499	0.246	0.431
Skilled Manual	0.418	0.493	0.301	0.459	0.517	0.500
Semi-Skilled Manual	0.136	0.343	0.088	0.284	0.078	0.269
Unskilled Manual	0.037	0.190	0.019	0.137	0.039	0.193
Mining and Quarrying	0.016	0.125	0.025	0.156	0.005	0.069
Manufacturing	0.277	0.448	0.357	0.479	0.101	0.301
Electric, Gas and Water Supply	0.011	0.103	0.030	0.171	-	-
Construction	0.096	0.294	0.065	0.247	0.322	0.467
Wholesale and Retail Trade	0.103	0.305	0.124	0.330	0.151	0.358
Hotels and Restaurants	0.027	0.162	0.007	0.081	0.020	0.141
Transport, Storage and Coms.	0.085	0.278	0.092	0.290	0.098	0.298
Financial Intermediation	0.021	0.144	0.122	0.327	0.013	0.113
Real Estate	0.096	0.294	0.128	0.334	0.172	0.377
Public Administration	0.092	0.288	0.015	0.122	0.001	0.028
Education	0.074	0.262	0.009	0.095	0.025	0.156
Health	0.056	0.229	0.003	0.058	0.027	0.161
Com., Soc., and Persn. Services	0.047	0.213	0. 022	0.148	0.065	0.247

Table 4: British Social Attitudes Survey 1985, 1987, 1993, 1996
Dependent Variable: Log Hourly Earnings

| | Fixed Wage | | | | | | PRP | | | | | | Self Employed | | | |
| | Spec. A | | Spec. B | | Spec. C | | Spec. A | | Spec. B | | Spec. C | | Spec. A | | Spec. B | |
	Coeff	T Stat	Coeff	T Stat	Coeff	T Stat	Coeff	T Stat	Coeff	T Stat	Coeff	T Stat	Coeff	T Stat	Coeff	T Stat
Age	0.0675	9.92	-	-	-	-	0.0551	5.97	-	-	-	-	0.0171	0.80	-	-
Age-Squared	-0.0007	-8.47	-	-	-	-	-0.0006	-4.86	-	-	-	-	-0.0001	-0.51	-	-
YILF[1]	-	-	0.0483	13.38	-	-	-	-	0.0360	7.36	-	-	-	-	0.0175	1.73
YILF-Squared	-	-	-0.0008	-10.57	-	-	-	-	-0.0005	-5.25	-	-	-	-	-0.0002	-1.08
Employer Tenure	-	-	-	-	0.0234	8.32	-	-	-	-	0.0159	3.73	-	-	-	-
Employer Tenure^2	-	-	-	-	-0.0003	-4.85	-	-	-	-	-0.0002	-3.67	-	-	-	-
Years of Education	0.0317	3.47	0.0439	4.64	0.0104	0.90	0.0301	2.54	0.0421	3.38	0.0315	1.66	0.0647	1.52	0.0241	0.73
Selectivity Term	0.0088	0.13	-0.2068	-2.97	0.0740	0.93	-0.4043	-3.97	-0.3600	-4.50	-0.2590	-2.48	0.8313	10.90	0.2151	2.12
Constant	-1.2737	-6.40	-0.3485	-2.08	1.0783	5.64	-0.2468	-0.74	0.3199	1.28	1.5331	3.93	0.4793	0.54	0.7479	1.07
Year Dummies	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Highest Ed. Cert	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Occupation Dummies	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Industry Dummies	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Turning Point (Years)	48.2		30.2		39.0		45.9		36.0		39.8		85.5		74.0	
R^2	0.5797		0.5675		0.4541		0.6499		0.6511		0.4337		0.6882		0.3034	
F Statistic	87.80 $_{(24, 1442)}$		87.50 $_{(24, 1442)}$		30.76 $_{(22, 801)}$		64.80 $_{(24, 758)}$		71.66 $_{(24, 758)}$		17.22 $_{(22, 335)}$		120.16 $_{(24, 466)}$		16.99 $_{(24, 466)}$	
Nos of Obs.	1467		1467		1467		783		783		783		491		491	

Notes:

1. YILF = Years in Labour Force

2. Highest Education Certificates: Degree, Further Education, A Level, GCSE Grades A-C, GCSE Grades below C, Other Qualification;

3. Occupation Dummies: Professional, Other Non Manual, Skilled Manual, Semi-skilled, Unskilled Manual; Industry Dummies: Energy, Metal Extraction, Metal Goods, Other Manufacturing, Construction, Distribution, Transport and Communications, Banking, Other Services.

4. Robust standard errors are reported.

5. Tests of equality of the estimated coefficients of age and age squared across the PRP and fixed wage wage equations led to a test statistic of 7.23 and tests of equality of the estimated coefficients of the age and age squared terms across the self-employed wage equation and that for PRP employees led to a test statistic of 8.67 suggesting that the age terms are significantly different at the 1% level across the three types of worker.

6. Tests of equality of the estimated coefficients of YILF and YILF-Squared squared across the PRP and fixed wage equations led to a test statistic of 7.10 and tests of equality of the estimated coefficients of the experience and experience squared terms across the self-employed wage equation and that for PRP employees led to a test statistic of 8.46 suggesting that the experience terms are significantly different at the 1% level across the three types of worker.

7. Tests of equality of the estimated coefficients of Employer Tenure and Employer Tenure squared across the PRP and fixed wage equations led to a test statistic of 6.25 suggesting that employer tenure terms are significantly different at the 1% level across two types of worker.

Table 5: British Household Panel: 1991-1999
Dependent Variable: Log Hourly Earnings

	Fixed Wage						PRP						Self Employed					
	Spec. A		Spec. B		Spec. C		Spec. A		Spec. B		Spec. C		Spec. A		Spec. B		Spec. C	
	Coeff	T Stat	Coeff	T Stat	Coeff	T Stat	Coeff	T Stat	Coeff	T Stat	Coeff	T Stat	Coeff	T Stat	Coeff	T Stat	Coeff	T Stat
Age	0.0895	35.29	-	-	-	-	0.0821	21.99	-	-	-	-	0.0607	2.26	-	-	-	-
Age-Squared	-0.0010	-30.83	-	-	-	-	-0.0009	-18.90	-	-	-	-	-0.0007	-2.33	-	-	-	-
YILF[1]	-	-	0.0578	37.00	-	-	-	-	0.0542	23.72	-	-	-	-	0.0336	1.96	-	-
YILF-Squared	-	-	-0.0008	-30.27	-	-	-	-	-0.0008	-19.02	-	-	-	-	-0.0006	-2.11	-	-
Job Tenure	-	-	-	-	0.0192	15.00	-	-	-	-	0.0151	7.18	-	-	-	-	0.0022	0.22
Job Tenure Squared	-	-	-	-	-0.0005	-9.73	-	-	-	-	-0.0003	-3.88	-	-	-	-	0.0002	0.80
Years of Education	-0.0007	-0.44	0.0155	9.13	0.0016	0.93	0.0001	0.04	0.0147	6.17	0.0017	0.72	-0.0086	-0.58	-0.0064	-0.41	-0.0059	-0.40
Selectivity Term	-0.1025	-10.58	-0.1059	-10.92	-0.0676	-6.79	0.0457	2.85	0.0476	2.96	-0.0099	-0.59	0.0019	0.03	0.0046	0.06	0.0362	0.51
Promotion	0.0284	2.61	0.0292	2.68	0.0661	5.68	0.4917	4.17	0.0500	4.24	0.0777	5.97	-	-	-	-	-	-
Annual Increment	0.0076	1.19	0.0078	1.22	0.0011	0.17	0.0191	2.24	0.0195	2.29	0.0030	0.34	-	-	-	-	-	-
Constant	-0.2252	-4.19	0.6561	18.33	1.5417	53.44	-0.0901	-1.05	0.7021	11.69	1.6222	33.70	-0.1138	-0.18	0.6329	1.45	0.9139	3.08
Year Dummies	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Highest Ed. Cert	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Occupation Dummies	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Industry Dummies	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Turning Point (Yrs)	44.8		36.3		19.2		45.6		33.9		25.2		43.4		28.0		5.5	
R^2 Within	0.0780		0.0749		0.0356		0.1153		0.1152		0.0570		0.0099		0.0097		0.0101	
R^2 Between	0.4186		0.4196		0.3480		0.4284		0.4304		0.3618		0.0353		0.0345		0.0337	
R^2 Overall	0.3926		0.3918		0.3269		0.4206		0.4195		0.3536		0.0381		0.0389		0.0383	
Wald Chi-Square	4145_{30}		4124_{30}		2507_{30}		2538_{30}		2553_{30}		1668_{30}		68.45_{28}		67.49_{28}		67.82_{28}	
Nos. of Obs.	14284		14284		14284		6212		6212		6212		3716		3716		3716	
Nos. of Groups	4594		4594		4594		2806		2806		2806		1153		1153		1153	

Notes:

1. YILF = Years in Labour Force

2. Promotion is a zero-one dummy variable equalling one if the respondent had been promoted in the current year and zero otherwise; Annual Increment is zero-one dummy variable equalling one if there is an incremental pay scale at the respondent's place of work and zero otherwise.

3. Highest Education Certificates: Degree, Further Education, A Level, GCSE Grades A to C, GCSE Grades below C, Other Qualification; Occupation Dummies: Managerial, Professional, Intermediate Non-Manual, Sales, Clerical, Personal Services, Skilled Manual, Semi-Skilled Manual, Unskilled Manual; Industry Dummies: Energy, Extraction, Engineering, Manufacturing, Construction, Distribution, Transport, Storage and Communication, Finance, Other Non Manufacturing.

4. Robust standard errors are reported.

5. Tests of equality of the estimated coefficients of age and age squared across the PRP and fixed wage equations led to a test statistic of 18.37 and tests of equality of the estimated coefficients of the age and age squared terms across the self-employed wage equation and that for PRP employees led to a test statistic of 126.76 suggesting that the age terms are significantly different at the 1% level across the three types of worker.

6. Tests of equality of the estimated coefficients of YILF and YILF squared across the PRP and fixed wage equations led to a test statistic of 1.82 and tests of equality of the estimated coefficients of the experience and experience squared terms across the self-employed wage equation and that for PRP employees led to a test statistic of 18.08 suggesting that the experience terms are significantly different at the 1% level across PRP and self-employed workers.

7. Tests of equality of the estimated coefficients of job tenure and job tenure squared across the PRP and fixed wage equations led to a test statistic of 12.30 and tests of equality of the estimated coefficients of the age and age squared terms across the self-employed wage equation and that for PRP employees led to a test statistic of 40.98 suggesting that the job tenure terms are significantly different at the 1% level across the three types of worker.

Table 6: Family Expenditure Survey 1997/98, 1998/99 and 1999/00
Dependent Variable: Log Hourly Earnings

	Fixed Wage				PRP				Self Employed			
	Spec. A		Spec. B		Spec. A		Spec. B		Spec. A		Spec. B	
	Coeff	T Stat	Coeff	T Stat	Coeff	T Stat	Coeff	T Stat	Coeff	T Stat	Coeff	T Stat
Age	0.0677	15.59	-	-	0.0553	5.27			-0.0019	-0.06	-	-
Age-Squared	-0.0007	-14.28	-	-	-0.0005	-3.77			-0.0001	-0.40	-	-
YILF[1]	-	-	0.0422	15.44	-	-	0.0380	7.21	-	-	-0.0240	-1.31
YILF-Squared	-	-	-0.0007	-14.36	-	-	-0.0005	-4.34	-	-	0.0001	0.47
Years of Education	0.0160	2.10	0.0311	4.33	0.0412	3.15	0.0610	4.66	-0.0162	-0.68	-0.0388	-1.53
Selectivity Term	0.1679	2.99	0.1956	3.04	-0.4378	-4.15	-0.4896	-4.47	-0.4030	-1.57	-0.6098	-2.44
Constant	0.7400	6.54	1.5724	17.09	1.3877	4.02	2.0280	8.20	3.4795	2.61	4.4272	4.30
Year Dummies	Yes		Yes		Yes		Yes		Yes		Yes	
Highest Ed. Cert	Yes		Yes		Yes		Yes		Yes		Yes	
Occupation Dummies	Yes		Yes		Yes		Yes		Yes		Yes	
Industry Dummies	Yes		Yes		Yes		Yes		Yes		Yes	
Turning Point (Years)	47.9		30.1		55.3		38.0		9.5		120.0	
R^2	0.3306		0.3304		0.4356		0.4430		0.3306		0.1522	
F Statistic	141.13 $_{(25, 5939)}$		143.52 $_{(25, 5939)}$		33.48 $_{(25, 1201)}$		35.88 $_{(25, 1201)}$		141.13 $_{(24, 1214)}$		10.26 $_{(24, 1214)}$	
Nos of Obs.	5965		5965		1201		1201		1239		1239	

Notes:
1. YILF = Years in Labour Force
2. Highest Education Certificates: Degree, Further Education, A Level, GCSE Grades A-C, GCSE Grades below C, Other Qualification;
3. Occupation Dummies: Professional, Other Non Manual, Skilled Manual, Semi-skilled, Unskilled Manual; Industry Dummies: Energy, Metal Extraction, Metal Goods, Other Manufacturing, Construction, Distribution, Transport and Communications, Banking, Other Services.
4. Robust standard errors are reported.
5. Tests of equality of the estimated coefficients of age and age squared across the PRP and fixed wage wage equations led to a test statistic of 56.02 and tests of equality of the estimated coefficients of the age and age squared terms across the self-employed wage equation and that for PRP employees led to a test statistic of 163.98 suggesting that the age terms are significantly different at the 1% level across the three types of worker.
6. Tests of equality of the estimated coefficients of YILF and YILF squared across the PRP and fixed wage equations led to a test statistic of 68.71 and tests of equality of the estimated coefficients of the experience and experience squared terms across the self-employed wage equation and that for PRP employees led to a test statistic of 345.83 for the BSAS suggesting that the YILF terms are significantly different at the 1% level across the three types of worker.

Table 7: Lambda $\left(\tilde{\lambda} \right)$ - Summary Statistics

$\tilde{\lambda}$	Family Expenditure Survey 1997/98, 1998/99, 1999/00		British Household Panel Survey 1997-1999	
	All Workers	PRP Workers	All Workers	PRP Workers
Mean	0.152	0.054	0.234	0.302
Standard Deviation	0.349	0.069	0.364	0.223
Minimum	0.000	$9.28_{\text{E-06}}$	0.000	0.001
Maximum	1.000	0.476	1.000	0.981
Observations	8405	1201	9187	2840

Note: Lambda is defined as the ratio of bonus pay to total pay – see Equation (9).

Table 8: Continuous Sharing Coefficient: FES 1997/98, 1998/99, 1999/00
Dependent Variable: Log Hourly Earnings

	Spec. 1		Spec. 2		Spec. 3		Spec. 4		Spec. 5		Spec. 6	
	Coeff	T Stat	Coeff	T Stat	Coeff	T Stat	Coeff	T Stat	Coeff	T Stat	Coeff	T Stat
Age	0.0755	18.08	0.0753	19.06	0.0783	21.06	-	-	-	-	-	-
Age-Squared	-0.0008	-15.75	-0.0008	-16.71	-0.0008	-18.45	-	-	-	-	-	-
YILF[1]	-	-	-	-	-	-	0.0457	20.48	0.0488	22.77	0.0489	23.19
YILF-Squared	-	-	-	-	-	-	-0.0008	-17.03	-0.0008	-19.29	-0.0008	-19.57
Lambda	-0.5354	-16.81	-	-	0.6085	1.37	-0.5566	-17.51	-	-	0.0259	0.19
Lambda* Age	-	-	-0.0193	-5.69	-0.0478	-2.22	-	-	-	-	-	-
Lambda* Age-Squared	-	-	0.0002	2.21	0.0005	1.88	-	-	-	-	-	-
Lambda* YILF[1]	-	-	-	-	-	-	-	-	-0.0413	-9.91	-0.0432	-3.72
Lambda* YILF-Squared	-	-	-	-	-	-	-	-	0.0007	5.59	0.0007	3.15
Years of Education	0.0109	1.56	0.0112	1.60	0.0111	1.58	0.0257	3.78	0.0256	3.76	0.0256	3.76
Constant	0.8587	7.21	0.8444	7.23	0.7882	6.94	1.8260	19.36	1.7869	19.04	1.785	19.03
Year Dummies	Yes		Yes		Yes		Yes		Yes		Yes	
Highest Ed. Cert	Yes		Yes		Yes		Yes		Yes		Yes	
Occupation Dummies	Yes		Yes		Yes		Yes		Yes		Yes	
Industry Dummies	Yes		Yes		Yes		Yes		Yes		Yes	
R^2	0.3071		0.3088		0.3088		0.3077		0.3113		0.3113	
F Statistic	154.92 $_{(25, 8379)}$		152.53 $_{(26, 8378)}$		152.53 $_{(26, 8378)}$		156.21 $_{(25, 8379)}$		156.61 $_{(26, 8378)}$		155.47 $_{(27, 8377)}$	
Nos of Obs.	8405		8405		8405		8405		8405		8405	

Notes:
1. Highest Education Certificates: Degree, Further Education/A Level, GCSE, below GCSE; Occupation Dummies: Managerial, Professional, Skilled Manual, Semi-Skilled Manual, Unskilled Manual; Industry Dummies: Mining and Quarrying, Manufacturing, Electricity, Gas and Water Supply, Construction, Wholesale and Retail Trade, Hotels and Restaurants, Transport, Storage and Communication, Financial Intermediation, Real Estate, Public Administration, Education, Health, Community Social and Personal Services.
2. Standard Errors adjusted according to the White-Huber approach due to the presence of heteroskedasticity.
3. Lambda = PRP/Total Pay.

Table 9: Continuous Sharing Coefficient: BHPS 1997-1999
Dependent Variable: Log Hourly Earnings

	Spec. 1		Spec. 2		Spec. 3		Spec. 4		Spec. 5		Spec. 6		Spec. 7		Spec. 8		Spec. 9	
	Coeff	T Stat	Coeff	T Stat	Coeff	T Stat	Coeff	T Stat	Coeff	T Stat	Coeff	T Stat	Coeff	T Stat	Coeff	T Stat	Coeff	T Stat
Age	0.0872	10.81	0.0791	9.58	0.0774	8.56	-	-	-	-	-	-	-	-	-	-	-	-
Age-Squared	-0.0010	-10.04	-0.0009	-8.17	-0.0008	-7.34	-	-	-	-	-	-	-	-	-	-	-	-
YILF[1]	-	-	-	-	-	-	0.0510	10.55	0.0483	9.63	0.0525	9.74	-	-	-	-	-	-
YILF-Squared	-	-	-	-	-	-	-0.0008	-9.39	-0.0007	-7.51	-0.0008	-7.79	-	-	-	-	-	-
Job Tenure	-	-	-	-	-	-							0.0201	4.90	0.0286	5.85	0.0242	4.75
Job Tenure Squared	-	-	-	-	-	-							-0.0005	-3.35	-0.0006	-3.33	-0.0005	-2.64
Lambda	-0.2620	-7.51	-	-	-0.1945	-0.46	-0.2637	-7.55	-	-	0.3631	2.13	-0.2412	-6.87	-	-	-0.1600	-3.41
Lambda* Age	-	-	0.0063	1.74	0.0159	0.75												
Lambda* Age-Squared	-	-	-0.0003	-3.83	-0.0004	-1.59												
Lambda* YILF[1]	-	-	-	-	-	-	-	-	-0.0023	-0.56	-0.0280	-2.20						
Lambda* YILF-Squared	-	-	-	-	-	-	-	-	-0.0002	-2.28	0.0002	0.73						
Lambda* Job. Tenure	-	-	-	-	-	-							-	-	-0.0376	-4.85	-0.0177	-1.82
Lambda* Job. Tenure[2]	-	-	-	-	-	-							-	-	0.0007	2.41	0.0002	0.69
Years of Education	-0.0071	-1.74	-0.0069	-1.69	-0.0069	-1.69	0.0021	0.48	0.0023	0.54	0.0025	0.58	-0.0050	-1.20	-0.0051	-1.22	-0.0050	-1.21
Constant	-0.1690	-1.01	-0.1071	-0.63	-0.0748	-0.41	0.8103	7.82	0.7823	7.56	0.7265	6.81	1.4589	18.66	1.4065	18.04	1.4409	18.36
Year Dummies	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Highest Ed. Cert	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Occupation Dummies	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Industry Dummies	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
R^2-Within	0.0020		0.0034		0.0034		0.0021		0.0037		0.0040		0.0025		0.0019		0.0019	
R^2-Between	0.1647		0.1677		0.1676		0.1620		0.1657		0.1659		0.1485		0.1475		0.1520	
R^2-Overall	0.1473		0.1498		0.1496		0.1453		0.1486		0.1492		0.1315		0.1313		0.1336	
Wald Chi-Squared	808_{26}		848_{27}		847_{28}		792_{26}		839_{27}		843_{28}		689_{26}		683_{27}		698_{28}	
Nos. of Observations	9187		9187		9187		9187		9187		9187		9187		9187		9187	
Nos. of Groups	4464		4464		4464		4464		4464		4464		4464		4464		4464	

Notes:
1. Highest Education Certificates: Degree, Further Education/A Level, GCSE, below GCSE; Occupation Dummies: Managerial, Professional, Skilled Manual, Semi-Skilled Manual, Unskilled Manual; Industry Dummies: Mining and Quarrying, Manufacturing, Electricity, Gas and Water Supply, Construction, Wholesale and Retail Trade, Hotels and Restaurants, Transport, Storage and Communication, Financial Intermediation, Real Estate, Public Administration, Education, Health, Community Social and Personal Services.
2. Standard Errors adjusted according to the White-Huber approach due to the presence of heteroskedasticity.
3. Lambda = PRP/Total Pay

Table 10: Training Frequencies

	PRP Employees			Salaried Employees			All Employees		
	Obs.	*Mean*	*S. Dev*	*Obs*	*Mean*	*S. Dev*	*Obs*	*Mean*	*S Dev*
BSAS 1987									
Train									
Exp. < 5 Yrs	28	0.9286	0.2623	50	0.9000	0.3030	78	0.9103	0.2877
5 < Exp.< 10 Yrs	31	0.7742	0.4250	52	0.7885	0.4124	83	0.7831	0.4146
10 < Exp. < 20 Yrs	61	0.7541	0.4342	101	0.6931	0.4635	162	0.7160	0.4523
Exp. > 20 Yrs	153	0.5882	0.4938	203	0.6847	0.4658	356	0.6433	0.4797
All Employees	273	0.6813	0.4668	406	0.7266	0.4463	679	0.7084	0.4548
Trains									
Exp. < 5 Yrs	28	3.8929	2.0788	50	3.7000	2.0923	78	3.7692	2.0758
5 < Exp.< 10 Yrs	31	2.6129	2.0278	52	2.6923	2.2798	83	2.6627	2.1768
10 < Exp. < 20 Yrs	61	2.4590	2.1952	101	2.4158	2.2058	162	2.4321	2.1951
Exp. > 20 Yrs	153	1.7190	1.9717	203	1.9803	1.9447	356	1.8680	1.9579
All Employees	273	2.2088	2.1395	406	2.3916	2.1400	679	2.3181	2.1401
BHPS 1991-1999									
Train	6212	0.1718	0.3772	14284	0.1246	0.3303	20496	0.1389	0.3458
Exp. < 5 Yrs	68	0.3088	0.4654	198	0.2475	0.4326	266	0.2632	0.4412
5 < Exp.< 10 Yrs	765	0.2065	0.4051	1792	0.1735	0.3788	2557	0.1834	0.3871
10 < Exp. < 20 Yrs	2015	0.1856	0.3889	4000	0.1465	0.3537	6015	0.1596	0.3663
Exp. > 20 Yrs	3364	0.1528	0.3598	8294	0.1006	0.3008	11658	0.1156	0.3198
All Employees	6212	0.1718	0.3772	14284	0.1246	0.3303	20496	0.1389	0.3458

Notes:
1. The BSAS survey for 1987 asked respondents, in the two years preceding the survey interview, whether they had been: (i) asked to do anything just for practice in order to learn the work; (ii) given any special talks or lectures about the work; (iii) placed with more experienced people to see how the work should be done; (iv) sent around to different parts of the organisation to see how the work is done; (v) asked to read things to help learn about the work; (vi) taught or trained by anyone whilst actually doing the work; (vii) sent on any courses to introduce new methods of working. 'Train' equals one if the respondent answered 'yes' to any of these questions, and zero otherwise. 'Trains' is an index that equals the number of these questions to which the respondent had answered 'yes'.
2. Participants in the BHPS were asked whether in the preceding year they had participated in any off-the-job education or training. For these respondents the variable 'Train' is a zero-one dummy variable recording their response.

Table 11: PRP and Training Incidence (Summary of Results)

	BSAS 1987								BHPS 1991-99			
	Probit (1)		Ordered Probit (1)		Probit (2)		Ordered Probit (2)		Probit (1)		Probit (2)	
	Dep Var = Train		Dep Var = Trains		Dep Var = Train		Dep Var = Trains		Dep Var = Train		Dep Var = Train	
	Coeff	T Stat	Coeff	T Stat	Coeff	T Stat	Coeff	T Stat	Coeff	T Stat	Coeff	T Stat
Experience	-0.0335	-5.95	-0.0324	-7.47	-0.0311	-4.72	-0.0292	-5.81	-0.183	10.49	-0.020	10.15
PRP Dummy	-0.0700	-0.59	-0.0071	-0.08	0.2736	0.64	0.6316	2.04	0.106	3.30	0.015	0.12
(Exp < 5)*PRP	-	-	-	-	0.0130	0.10	-0.0878	-0.99	-	-	0.099	2.27
(5 < Exp < 10)*PRP	-	-	-	-	-0.0525	-0.87	-0.0899	-2.07	-	-	-0.002	0.14
(10 < Exp < 20)*PRP	-	-	-	-	-0.0211	-0.76	-0.0440	-2.15	-	-	0.003	0.40
(Exp > 20)*PRP	-	-	-	-	-0.0116	-0.88	-0.0211	-2.12	-	-	0.005	1.15
Log Likelihood	-339.3235		-1219.0619		-338.37818		-1215.8068		-6738.750		-6733.579	
Nos of Observations	679		679		679		679		20496		20496	

Notes:
1. See Note 1 to Table 10 for definitions of 'Train' and 'Trains'.
2. Controls were also included for occupation, region, industry, education, firm size, marital status and ethnicity.