

Fixed Wages or Productivity Pay: Evidence from 15 EU Countries

Marc Cowling

ABSTRACT. A simple model of the firms' decision to pay workers productivity related pay is tested using individual worker level data from 15 EU member states. We find empirical support for the key hypotheses of Lazear type PRP models which relate to firm size and permanence of employment. Other issues such as the organisation of production and the nature of the product or service were found to be very peripheral to the use of PRP systems across countries.

1. Introduction

The aim of this paper is to analyse the determinants of firms choice of productivity related pay by using data from the 1996 European Foundation Second European Survey on Working Conditions.¹ Our analysis focuses solely on the private business sector, and defines productivity related pay (PRP) as a system in which a workers pay is linked in a direct way to her output. Thus we include piece rates in our measure, alongside alternative systems linking pay and productivity.

The issue of PRP itself is interesting and one in which a number of national governments have been visibly proactive in promoting in recent years. As to why this might be the case, Booth and Frank (1996) and Brown (1997) both cite the desire to increase labour market flexibility and stimulate productivity and/or employment growth. Heywood et al. (1998), in an analysis of German firms, take this line of argument further by suggesting that the incorporation of variable payment schemes into the labour agreements of individual firms had been a major step towards alleviating unemployment. At the firm level, we draw on the

work of Heywood et al. (1997) which uses the Workplace Industrial Relations Survey (WIRS) to test for the effects of monitoring, technology, job security, competition and industrial relations on the incidence of PRP. One caveat for us is that we have no comparable technological regime information.

In terms of the underlying theoretical motivation for PRP, the literature strongly features the interrelated issues of monitoring of workers and measurement (Heywood et al., 1997; Garen, 1994), the attraction of high quality workers or sorting argument (Booth and Frank, 1996; Lazear, 1986, 1996) and effort levels, a feature which is common across all theories. In her analysis of Australian Performance Pay Provisions, Brown (1997, pp. 353–354) identifies five fundamental objectives; attracting and retaining competent employees, and via a goal setting process, providing a focus for formal training activities; to promote an achievement orientation, to reward superior performance; to promote the achievement of organisational objectives; to share the economic benefits of improved performance, and; to promote employee responsibility.

In particular, the theory presented by Heywood et al. which is in itself an extension to the Lazear (1986) model, argues that there are significant costs involved in designing a measurement system in order to correctly measure performance or output. Crucial to this model is that the costs of designing and implementing a PRP system are fixed across firms. Thus the costs per worker are smaller the larger the (employment) size of firm. The alternative to a PRP system are concentrated in the costs of worker supervision. In a simplified model the trade-off between the two systems is largely in the costs of designing and implementing a PRP system versus the monitoring or supervisory costs for time rate workers.

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*Research Centre for Industrial Strategy
The Birmingham Business School
University of Birmingham
Birmingham B15 2TT
U.K.
E-mail m.cowling@bham.ac.uk*



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2. The model

We begin by modifying the model adopted by Heywood et al. (from Lazear, 1986) by assuming that there are three types of worker; those with long expected tenure, those with medium term expected tenure, and those with short expected tenure. Empirically we proxy these three types of worker by the nature of their current employment contracts. The three types of contract which map in to our three types of worker are; employed on a permanent basis, employed on a fixed term contract, and employed on a temporary agency contract. This division is critical to our model as those workers on permanent contracts can be motivated with other forms of compensation systems, such as deferred compensation schemes, implicitly an upward sloping age/earnings profile such as that described in Lazear (1979).

On this Lazear assumes that workers and firms enter into long-term implicit contracts designed to reduce the probability of shirking by loading compensation to the end of contracts. The mechanism by which workers are induced to supply the required effort levels acts through the discipline of firing. In short workers who shirk are more likely to get fired and hence miss out on higher relative compensation in the future. To hold true the Lazear model requires that at a given time workers are not paid their marginal product. When they are young or have just entered the firm their wages might be below their marginal product. After long periods of in-firm tenure the opposite may be true. Thus wage compensation will outstrip productivity over time. Empirically, Hutchens (1987) finds evidence consistent with the Lazear model. However, Hutchens (1987) also notes that delayed payments contracts are but one solution to the firms agency problem, an alternative being to invest in additional supervision. To maintain consistency with earlier work, and in line with Heywood et al., we assume that there are fixed costs of setting up an appropriate PRP scheme. In larger firms these fixed costs are spread across larger numbers of workers, thus reducing the fixed cost per worker of PRP.

The total monitoring costs for a firm of size L can be expressed thus;

$a_i L$ for time rates where $i = 1$ for permanent employment contracts, $i = 2$ for fixed term

contracts and $i = 3$ for temporary contracts. Crucial to the model is that $a_3 > a_2 > a_1$. Thus the longer the expected tenure the easier it is to monitor workers, and the cheaper the per worker supervisory costs.

The costs of a PRP system can be divided into fixed and variable, or per worker supervisory costs. The total PRP costs can be expressed thus;

$F + gL$, where F is the fixed costs element and g is the per worker supervision costs.

The rational firm will only choose a PRP system in cases where per worker supervisory costs, given F , are lower under PRP. Implicitly this requires that $a_3 > a_2 > a_1 > g$.

In small firms, whilst the costs of supervision are high per worker, in total they are still likely to be lower for time-rate systems given the fixed cost, F , of setting up a PRP system.

For the worker, utility is derived from income and disutility from effort. Thus for an individual worker, $U_i = Y_i - C(E_i)$, where Y_i is income for $E = Y$, and $C(\cdot)$ is an increasing function where C' and C'' are both positive. In this case we assume finite effort levels.

The firms objective is to maximise profits, which requires that the workers compensation structure is such that workers are willing to supply their labour to the firm in the first instance. Given labour supply, the firm must then select the most appropriate compensation structure to profit maximise. Here the firm must maximise the net surplus from inducing increased effort minus the fixed and variable costs of designing and implementing an appropriate compensation system. For a time rate worker, monitoring ensures that a minimum level of effort is supplied by workers, although individual workers may choose to supply more effort ($E > E_{\min}$). In line with the firms objective, workers also seek to maximise their net surplus when choosing between time rate systems and PRP systems, thus yielding the workers decision as, $\max e - C(e)$. In this case the workers decision to choose a time rate can be expressed thus;

$$E_m - a_i - C(E_m) > E^* - (F/L + g) - C(E^*) \quad (1)$$

Here the left hand side of the equation relates to time rates and the right hand side to PRP. In line

with Heywood et al. and Lazear we reiterate that if $E_{\min} = E^*$ then the decision between PRP and time rates rests solely upon the unit monitoring costs. Further, the greater the divergence between the two the greater the probability that PRP systems will be implemented, as PRP induces higher effort levels all else equal. Three other implications are tested by Heywood et al., two of which can be tested using our data. These are;

- (I) The larger the employment size of the firm, L , the higher the probability that PRP systems will be adopted. This occurs as the design and implementation costs of a PRP system are spread over more workers.
- (II) The shorter the expected tenure of workers, the increased probability of PRP. In our case we hypothesise that our temporary contract workers have the highest probability of PRP, our fixed term contract workers the next highest, and our permanent contract workers the lowest incidence.

Concerning hypothesis (II), there is a fairly substantial literature that suggest that women are poorly motivated by deferred compensation because of their historically lower attachment to the labour force (see for example, Royalty, 1998; Heywood and Wei, 1997). The latter also argue that women would find the desired flexibility in production settings suitable for piece rates, and further that piece rates are a means of avoiding gender pay discrimination. Yet Goldin (1986) counters this by suggesting that the female labour force has begun to be populated by a more heterogeneous group with regard to life-cycle labour force participation. This draws empirical support from Cowling (2000).

Seiler (1984) provides some important insights regarding the variability of pay across different compensation systems. On this he notes that time workers incomes are insensitive to the vagaries of production and to short run fluctuations in demand. This leads to an incentive-earnings effect on PRP systems which reflects a risk compensating differential on the one hand, as well as a pure effort effect on the other. An important caveat was that piece workers might be induced to withhold effort in periods of high potential output, for fear of downward adjustments in piece rates. Ichniowski and Shaw (1995) also imply that

workers are concerned about improving productivity as it may jeopardise their own jobs. The counterpart to this line of argument is provided by Roumasset and Uy (1995) who state that piece rates are only chosen over time rates for tasks where shirking is easy to monitor by *ex post* inspection. This is supported by Goldin (1986) who refers to a situation in which PRP systems are dependent upon the ability of goods to be divided into pieces, thus facilitating the division of labour and enhancing productivity. A key point in her argument is that this can occur even where there are no monitoring costs. An interesting adjunct to the effort enhancement PRP effect is reported by Drago (1991) who explicitly tests whether effort is positively influenced by formal incentive schemes and finds no significant effects.

Further evidence from the literature, notably Fernie and Metcalf (1997) and Hutchens (1987) permit us to frame a further testable hypothesis concerning observability and measurement of output.

- (III) Repetitive jobs permit greater use of PRP whereas a job with a wide range of tasks points to the use of basic pay (Fernie and Metcalf, 1997, p. 6).

This hypothesis is derived from their analysis of computer telephonists whom they argue are prime candidates for PRP systems as “the possibilities for monitoring behaviour and measuring output are amazing to behold” (p. 3). Hutchens (1987) ties this more explicitly back to our theoretical model in the sense that he associates jobs with repetitive tasks with shorter job tenures.

A further interesting line of enquiry is on the issue of quality of output. For example, Edwards, Collinson and Rees (1998), studying employee responses to Total Quality Management (TQM), find that growing work effort was not disliked by workers. Their results are broadly supportive of the “disciplined worker” hypothesis in that shifts to TQM are more favourably received in “controlled” work environments. They conclude that “the conditions for success in quality programmes are notably high job security” (p. 449). This “quality” effect is also noted by Drago and Heywood (1995) who support the view that in cases where product quality is crucial to profitability, then firms would tend to avoid piece rates

(p. 511). Ichniowski and Shaw (1995) present a much stronger case for rejecting PRP systems where output quality is an issue by arguing that linking pay to output quantity can undermine long-run profits that are achievable through quality of output. This allows us to present a fourth hypothesis;

- (IV) In situations where product quality is important, the incidence of PRP systems will be reduced.

A final strand of enquiry which is common in the literature is institutionalisation, embeddedness, or intransigence. For example, Eisenhardt (1988) contends that even in seemingly homogenous firm settings, different ideas about managing exist. That is to say different management teams hold different views about how best to manage workers and more importantly about how best to incentivise them. Importantly, she argues that in some firms compensation policy is so institutionalised that the possibility of change is never considered (p. 504). This feature is supported empirically by Ichniowski and Shaw (1995) who show that worker age and managerial tenure both have negative effects on the adoption of new work practices in their study of U.S. steel production lines.

A final testable hypothesis which can be drawn out of the literature relates to production norms. Here, both Rebitzer et al. (1996) and Drago and Heywood (1995) support the view that strong group effect norms may obviate the need for formal incentive schemes. Thus our final hypothesis is simply;

- (V) Where the pace of work is to a large extent dictated by production norms, the incidence of PRP systems will be reduced.

Having framed our hypotheses, we turn our focus of attention to the issue of empirical testing. Given the richness of the data we can explicitly find a number of empirical proxies capable of testing our theoretical model. For example we have three potential alternative variables which capture the job security/tenure aspect of the model which represent the a_i 's. Firstly, we have an explicit survey question which asks each worker "You Have a Secure Job? Please answer yes or no." Secondly, we have individual worker job tenure in

their current employment measured in months. Thirdly, we have information on whether individual workers have permanent, fixed or temporary contracts.

On firm size, we have information on total firm size within the individual workers country of employment. This is a banded variable with employee size bands of 0 for the self-employed, 1–9 which represents micro-businesses, 10–49 which represents small firms, 50–99 which represents small/medium firms, 100–499 representing medium-sized firms and 500+ which equates with large firms. Alternative measures which add insight to the nature of worker supervision include survey variables on whether the pace of work is dependent, or not, on the direct control of your boss.

3. The data

The second European survey on working conditions took place in January 1996 and collated the views of 15,800 workers from all over Europe. 1,000 workers in each Member State of the European Union (15 Member States in 1996) were questioned simultaneously about their working conditions. The sample is representative of the working population (employees and the self-employed). It is a questionnaire based survey, involving face-to-face interviews conducted outside the workplace. The questionnaire covers all aspects of working conditions: physical environment, workplace design, working hours, work organisation and social relationships at the workplace.

4. Sample statistics

In this section we discuss the sample statistics by country distinguishing between workers on PRP and time rates. The discussion is presented by various sub-sections in order that the reader is not swamped by the enormous volume of data considered in the empirical estimation.

In eight of the EU-15 countries more than 70% of workers were in basic waged employment. The most notable exception was Greece where only 45% of workers were paid a fixed wage. For workers who did receive at least an element of PRP, in Luxembourg, U.K. and Austria there were

TABLE I
Payment method by country (% of workers)

	Other	Wage	Wage/PRP	PRP
Belgium	22.43	68.38	5.02	4.17
Denmark	5.62	77.51	5.62	11.24
Germany	12.32	75.89	7.07	4.71
Greece	7.58	45.34	4.72	42.36
Spain	16.93	61.93	7.42	13.72
France	12.02	75.27	6.97	5.74
Ireland	19.97	67.49	1.65	10.89
Italy	29.05	55.38	6.49	9.08
Luxembourg	16.43	77.29	5.31	0.97
Netherlands	14.47	77.74	4.28	3.52
Portugal	11.31	64.27	2.96	21.47
United Kingdom	10.41	77.57	7.18	4.84
Austria	12.14	77.52	8.97	1.38
Sweden	8.01	74.29	9.18	8.51
Finland	9.03	56.89	14.74	19.33

much higher proportions of workers on mixed wage and PRP payment systems than pure PRP. The reverse was true in Greece particularly, and also in Spain, Ireland and Portugal. In terms of which countries had the highest overall proportions of workers on some form of PRP system, Greece dominated with 47%. Other notable countries include Finland (34%), Portugal (24%) and Spain (21%).

Gender

There are clearly identifiable differences in the incidence of PRP by gender in 8 out of the 15 EU

countries (Table II). In all cases men were more likely than women to have PRP. There is also considerable variation across countries in terms of the difference in the respective proportions of males in each payment regime. In Finland, Denmark and Sweden, for example, men were twice as likely to receive PRP than time rates.

Age

Age, perhaps surprisingly, does not appear to be an important factor in the majority of countries. Only in Greece, Spain and the Netherlands (Table II) were any differences identified. Interestingly, in both Greece and Spain workers on PRP tended to be older (by 6 years and 4 years respectively), which contrasts with the Netherlands where they were typically four years younger.

Marital status

Across countries there are identifiable differences between the marital status of workers on PRP and time rates (Table II). For example, divorcees were more likely to be on PRP in Germany, France, Luxembourg, U.K. and Sweden. People living together but unmarried also had the highest propensity to be on PRP in Spain, Italy, The Netherlands and Finland. By contrast, only in Greece were married people most likely to be on PRP systems.

TABLE II
PRP incidence by personal demographics and country

	Be	Den	Ger	Gr	Sp	Fr	Ire	It	Lux	Ne	Por	UK	Aus	Sw	Fin
Male	14.2	21.1	14.2	46.6	23.2	16.6	14.4	16.8	5.6	8.8	27.3	13.2	11.1	21.7	43.3
Female	8.5	10.1	8.5	47.9	16.9	8.4	9.2	13.3	7.7	6.0	20.8	10.0	9.4	9.9	19.6
Married	9.5	17.4	12.6	52.0	26.1	9.3	13.9	16.1	7.4	7.2	24.1	12.9	10.7	15.8	32.4
Single	10.0	16.1	9.7	38.6	12.1	15.2	10.1	15.3	4.7	6.7	27.3	9.7	9.1	24.6	33.6
Cohabiting	4.5	15.0	12.2	25.0	27.8	18.5	5.9	18.2	0.0	11.5	20.0	14.3	8.3	14.4	42.0
Divorced	3.3	30.0	13.0	26.7	16.7	19.0	0.0	0.0	12.5	9.7	17.4	15.4	11.4	30.8	31.0
Split	33.3	0.0	7.1	0.0	15.4	0.0	12.5	16.7	0.0	*	0.0	0.0	37.5	20.0	28.6
Widowed	18.2	33.3	6.1	46.7	18.2	7.1	30.0	0.0	0.0	8.3	29.4	0.0	0.0	22.2	37.5
Kids	7.3	15.7	13.1	47.5	23.1	12.5	10.0	15.3	8.2	8.4	20.2	10.6	10.5	18.2	34.5
No kids	10.3	17.6	11.1	46.9	20.0	12.9	14.7	15.7	4.9	7.4	28.3	13.2	10.3	17.3	33.8
Degree	10.6	17.0	7.0	33.5	21.1	15.3	9.3	17.7	7.6	6.5	18.3	14.9	5.3	15.2	30.6
A level	8.1	13.9	12.1	45.6	20.2	12.6	10.8	16.1	6.2	8.5	26.7	12.5	10.0	19.9	40.0
O level	8.8	24.5	16.5	56.2	21.8	8.3	23.2	13.5	3.2	8.4	24.9	9.6	13.4	16.2	26.7

Children

In only two countries were there identifiable differences between workers with children and use of PRP systems (Table II). In both cases, namely Ireland and Portugal, having children reduced the likelihood of being on PRP. What the data suggests is that this is not on the face of it a clear area of distinction in the majority of EU countries.

Education

There is considerable variation in the incidence across the distribution of workers by years of completed full-time schooling, our measure of worker education (Table II). In eight countries there are identifiable trends in educational achievement and use of PRP systems. In Germany, Greece, Austria and Ireland degree level workers (left full-time education at age of 20 years old minimum) were less likely to be on PRP systems, compared to "O" level equivalent workers who are more likely to be on PRP. In France, Italy, and Luxembourg and the U.K. the reverse is true. In summary we note that on this issue there is considerable variation in payment systems by level of worker education across countries.

Employment contracts

Focusing, initially, on the self-employed, we note that in eleven of the fifteen countries the incidence of PRP is highest in this form of employment (Table III). Concerning the incidence of PRP across workers with permanent, fixed and temporary employment contracts, we might expect that PRP increases as we move along the list from permanent to temporary contracts. This is broadly found to be the case if we consider the low incidence of PRP amongst permanent contract workers.

Sector

The incidence of PRP is highest in agriculture in eight countries (Table IV). Other sectors with large relative shares of PRP are construction and manufacturing. In Greece, for example, 97% of agricultural workers are on PRP. Where the incidence of PRP systems is lowest tends to be in real estate, catering and other services

Occupational status

PRP systems, with the notable exceptions of Greece, Spain, France and Italy, are heavily con-

TABLE III
PRP incidence by employment contracts and country

	Be	Den	Ger	Gr	Sp	Fr	Ire	It	Lux	Ne	Por	UK	Aus	Sw	Fin
Self-employed	15.4	46.4	7.6	72.3	36.8	20.6	24.3	17.4	8.9	18.2	45.4	21.2	7.7	25.0	53.5
Fixed contract	3.8	14.9	15.3	12.2	12.8	11.3	5.9	11.1	0.0	7.4	10.9	7.4	20.3	31.3	17.3
Permanent contract	7.6	12.9	12.5	12.3	14.9	11.3	6.7	12.2	5.7	6.4	8.0	10.2	9.9	16.0	30.4
Temporary contract	5.9	18.2	26.3	17.9	14.3	12.0	16.7	21.7	0.0	0.0	39.3	5.9	33.3	17.1	16.7

TABLE IV
PRP incidence by industry sector and country

	Be	Den	Ger	Gr	Sp	Fr	Ire	It	Lux	Ne	Por	UK	Aus	Sw	Fin
Agriculture	9.1	31.6	18.2	97.1	29.8	10.9	23.0	25.0	0.0	2.6	46.0	26.7	10.8	24.1	50.0
Manufacturing	12.8	16.3	21.5	30.1	22.9	12.8	9.6	16.1	7.9	7.1	15.5	15.5	18.3	20.9	40.2
Construction	9.6	22.8	13.2	44.3	20.3	9.7	28.3	14.3	7.1	16.3	35.4	23.7	12.9	21.4	47.9
Retail	10.9	11.5	7.3	39.9	22.0	14.3	9.4	10.2	4.7	9.7	26.8	9.3	6.6	14.6	21.8
Catering	9.3	14.3	7.0	22.4	15.4	13.8	5.7	20.8	50.0	11.1	20.0	0.0	2.2	17.6	12.5
Tran & Comm	9.3	21.7	7.1	51.3	19.4	16.0	9.4	13.8	0.0	3.8	15.4	10.6	10.3	15.6	22.8
Real Estate	18.2	17.9	7.4	37.5	20.8	18.0	6.3	23.4	0.0	5.4	20.4	12.5	0.0	19.0	46.4
Other Services	10.3	19.6	5.1	37.7	18.0	10.9	8.0	15.4	8.3	5.7	23.5	11.7	6.2	13.1	23.9

centrated in craft trades (Table V). Other occupations where PRP has substantial coverage are plant and machinery operatives and amongst managers. In the latter case nearly 47% of Finnish managers have at least part of their incomes related to performance. This is lower than the 52% figure for Greek managers.

Firm size

Perhaps the most common feature of the data is that there is a “U” shape in the concentration of PRP systems by size of firm (Table VI). Thus we observe relatively high concentrations of PRP in the very smallest and the very largest firms, and low concentrations in medium sized firms (50–500 employees). The notable exceptions are Greece and Portugal where PRP is hugely concentrated amongst the self-employed and in micro firms (less than 10 employees), and falls off dramatically in all larger size categories of firm.

At the self-employed level, seven countries have particularly high concentrations of PRP systems, ranging from 67% in Greece to 15% in Belgium. For micro firms ten countries have PRP proportions above 10% of the workforce. At the

large firm level (> 500 employees), twelve countries have large firm shares in excess of 10% of the total workforce. A particularly interesting feature of the data is that for most countries the respective share of PRP systems is very low in medium sized firms.

Autonomy, control, monitoring and quality

Here we have eleven survey variables which capture various aspects of an individual's job. These range from narrow job specific autonomy measures (Table VII), to wider firm level control issues, to measures concerning the ability of the firm to monitor workers and quantify output. We also include measures of job quality and quality of output.

Relating to job autonomy, we find that workers on PRP tend to have greater autonomy than time rate workers. For example, in Belgium, Greece and Portugal PRP workers are much more likely to be able to solve unforeseen problems on their own, without referral to managers. Further PRP workers are also much more likely to be able to change their order of tasks. In a number of countries, PRP workers were much more able to change

TABLE V
PRP incidence by occupation and country

	Be	Den	Ger	Gr	Sp	Fr	Ire	It	Lux	Ne	Por	UK	Aus	Sw	Fin
Manager	7.8	5.7	3.6	52.3	23.6	22.7	8.3	7.9	11.1	10.8	31.8	10.6	6.5	15.2	46.9
Professional	11.4	17.2	0.0	48.9	18.9	17.6	3.8	19.6	15.4	3.0	25.0	4.2	37.5	10.9	19.4
Technician	10.9	9.8	7.1	64.3	21.4	14.4	7.7	12.5	0.0	4.5	24.0	13.3	8.2	16.1	33.7
Clerical	3.5	3.5	2.2	8.7	15.8	6.1	4.5	15.0	6.0	3.2	13.2	7.4	4.6	11.5	9.8
Sales	9.6	35.7	9.5	54.1	29.8	12.9	9.1	19.6	5.3	10.7	22.5	5.0	11.6	17.9	23.7
Craft	14.4	24.6	20.3	18.0	22.4	14.3	17.5	13.8	8.6	11.6	25.4	22.2	14.1	27.1	45.1
Operative	15.8	25.0	18.3	27.9	26.0	12.7	12.0	18.7	0.0	6.9	11.1	16.9	14.6	25.5	36.5
Unskilled	7.7	21.7	14.6	17.0	10.8	9.4	9.1	12.4	5.9	11.7	26.0	9.3	11.4	15.0	22.0

TABLE VI
PRP incidence by firm size and country

Firm size	Be	Den	Ger	Gr	Sp	Fr	Ire	It	Lux	Ne	Por	UK	Aus	Sw	Fin
0	15.4	40.0	9.1	67.0	31.1	13.9	16.2	12.6	7.1	10.0	45.3	23.7	9.6	27.1	48.2
1–9	9.8	15.7	8.7	54.5	15.7	12.2	11.9	16.0	2.3	6.5	26.7	11.5	2.8	18.3	34.0
10–49	6.1	13.6	12.7	11.6	15.6	7.9	10.5	9.0	7.5	12.7	7.8	6.0	10.5	15.6	17.9
50–99	4.5	7.4	12.9	6.1	14.0	10.9	12.1	5.6	12.5	5.6	13.2	11.6	15.4	9.1	27.0
100–499	8.6	16.9	15.4	10.0	20.9	18.1	5.1	9.8	5.6	7.9	12.0	11.9	13.5	28.0	33.0
500+	9.6	18.6	14.8	26.7	31.5	14.6	14.1	25.2	6.8	5.5	17.9	12.5	19.3	15.0	37.6

TABLE VII
PRP incidence by job characteristics and country

		Be	Den	Ger	Gr	Sp	Fr	Ire	It	Lux	Ne	Por	UK	Aus	Sw	Fin
Solve:	Yes	10.6	17.4	10.5	50.8	21.8	12.7	11.1	16.6	8.1	7.4	26.8	12.4	10.1	17.6	35.2
	No	3.3	10.8	17.1	33.5	16.0	13.1	7.4	11.7	0.0	9.1	14.5	8.2	11.1	20.5	27.8
Decision:	Yes	9.9	15.6	11.9	45.5	21.4	13.8	8.2	16.2	7.6	7.0	27.1	10.5	11.1	19.1	36.1
	No	8.4	17.9	11.8	39.7	21.0	12.0	11.7	15.0	3.5	8.8	22.2	13.6	9.0	14.3	31.6
Direct:	Yes	7.2	17.5	15.9	10.8	19.3	10.4	7.8	17.3	6.9	11.5	13.8	11.1	12.0	20.0	26.2
	No	9.9	17.0	9.9	58.4	22.6	14.5	13.4	14.6	4.8	6.6	30.0	12.3	9.8	17.0	35.8
Norms:	Yes	13.2	24.0	19.6	49.6	30.4	18.0	16.2	19.6	10.9	8.8	22.4	16.0	16.6	21.0	40.0
	No	7.6	11.8	7.5	41.1	15.9	9.5	6.9	12.9	3.8	6.9	24.2	10.1	6.7	14.5	26.4
Order:	Yes	11.0	15.9	9.8	57.2	24.0	13.1	13.4	16.6	6.3	8.3	29.0	12.3	9.0	15.8	34.0
	No	4.5	21.2	14.0	29.6	15.9	11.6	11.1	14.0	6.8	5.4	15.6	11.6	12.6	24.8	33.6
Method:	Yes	10.3	16.7	9.8	56.1	23.8	13.4	13.1	17.8	5.3	8.4	27.6	12.9	9.2	16.0	33.7
	No	4.6	17.9	15.1	27.6	15.4	10.8	11.7	9.1	8.0	4.7	15.2	10.1	12.2	25.3	34.3
Learn:	Yes	10.9	15.9	10.2	45.1	22.8	13.5	10.1	17.8	7.3	7.5	24.4	12.5	10.9	15.9	34.8
	No	5.9	21.2	16.9	48.2	18.5	10.9	11.5	7.8	2.1	8.5	23.4	10.7	9.2	31.5	29.1
Consult:	Yes	12.1	14.0	11.9	43.5	21.8	13.6	10.2	20.1	8.3	7.4	20.8	11.8	12.7	16.7	33.2
	No	8.2	20.7	11.8	48.6	20.7	12.1	14.3	12.5	4.9	8.6	25.7	12.1	8.6	18.4	33.2
Short:	Yes	9.0	18.9	19.3	45.2	25.0	13.0	14.7	14.8	3.0	9.1	24.9	16.5	14.6	23.1	34.9
	No	9.3	15.9	9.8	47.8	19.1	12.7	11.7	15.7	7.2	7.2	24.2	10.4	9.0	15.4	33.9
Quality:	Yes	10.3	19.4	13.4	48.5	22.8	13.8	12.4	17.9	8.3	7.2	22.3	12.3	11.6	19.1	37.2
	No	5.3	6.5	7.1	41.8	16.7	10.4	3.6	10.4	4.3	10.9	26.5	10.0	7.1	12.2	21.4
Home:	Yes	16.0	42.9	9.6	74.3	42.9	22.0	24.8	20.9	3.7	18.3	45.2	22.2	8.5	25.7	48.5
	No	8.0	15.1	12.0	45.8	18.9	11.4	10.3	15.4	6.4	6.8	22.4	11.2	11.0	17.4	31.4
Tenure:	Yes	11.3	12.6	13.9	19.1	15.5	9.0	16.6	11.2	15.0	8.5	16.1	9.1	14.2	13.0	11.8
	No	11.6	10.1	12.0	11.8	11.7	10.5	11.8	12.3	13.4	11.0	12.4	9.0	13.5	12.8	12.5
Secure:	Yes	7.4	14.0	9.1	49.2	21.6	12.3	10.4	14.6	5.9	6.7	17.2	9.0	12.0	17.0	32.3
	No	12.5	32.9	15.5	43.7	19.6	14.6	15.5	17.8	3.6	11.5	40.4	20.0	8.8	22.6	38.1

their methods of working. One potentially distorting feature vis à vis job autonomy, was that PRP workers in all countries, were more likely to have their pace of work dictated by “production norms”.

On the nature and extent of workers ability to participate in firm level decision-making, we find conflicting evidence, although in general the number of countries with substantial differences was small. In terms of individual workers participation in department level decision-making, we find no differences. On the question of whether workers were consulted over organisational change, we note that PRP workers in Belgium, Italy and Austria had much higher consultation rates. The opposite was true in Denmark.

Concerning monitoring and measurement, we find that PRP workers are substantially less likely

to be directly controlled by their boss in Greece, Ireland, Portugal, and Finland and more likely to be in Germany. We also note that in ten countries home workers are far more likely to be on PRP systems than time rates. The data also suggests that PRP workers are more likely to be involved in jobs characterised by short, repetitive tasks. Other measures tested were the ability of workers to “learn new things” in their general working environment. Here there was little delineation between PRP and time rate workers. In nine countries however, PRP workers were significantly more likely to be required to meet precise quality standards.

Finally we observe that in six of the EU-15 countries PRP workers had significantly longer job tenure. Yet they were also less likely to feel secure in their positions.

5. Estimation

The empirical results were generated using a multinomial logit function (Aldrich and Nelson, 1984, pp. 73–77; Greene, 1997, Ch. 19). If we consider the potential outcomes as our different types of payment systems, namely, wage; wage/prp; prp; other recorded in γ , and our explanatory variables $\times$ as described in the data section, then the values of γ are unordered.

In the multinomial logit model, we then estimate a set of coefficients $\beta^{(1)}$, $\beta^{(2)}$, $\beta^{(3)}$, $\beta^{(4)}$ which correspond to each outcome category:

$$\Pr(\gamma = 1) = \frac{\ell^{\chi\beta^{(1)}}}{\ell^{\chi\beta^{(1)}} + \ell^{\chi\beta^{(2)}} + \ell^{\chi\beta^{(3)}} + \ell^{\chi\beta^{(4)}}} \quad (\text{other})$$

$$\Pr(\gamma = 2) = \frac{\ell^{\chi\beta^{(2)}}}{\ell^{\chi\beta^{(1)}} + \ell^{\chi\beta^{(2)}} + \ell^{\chi\beta^{(3)}} + \ell^{\chi\beta^{(4)}}} \quad (\text{waged})$$

$$\Pr(\gamma = 3) = \frac{\ell^{\chi\beta^{(3)}}}{\ell^{\chi\beta^{(1)}} + \ell^{\chi\beta^{(2)}} + \ell^{\chi\beta^{(3)}} + \ell^{\chi\beta^{(4)}}} \quad (\text{waged/prp})$$

$$\Pr(\gamma = 4) = \frac{\ell^{\chi\beta^{(4)}}}{\ell^{\chi\beta^{(1)}} + \ell^{\chi\beta^{(2)}} + \ell^{\chi\beta^{(3)}} + \ell^{\chi\beta^{(4)}}} \quad (\text{prp})$$

In order to identify the model it is necessary to set one of the β 's to zero so that the other β 's can be measured as changes relative to that γ group. For our purposes we chose waged as our base category, thus we set $\beta^{(2)} = 0$.

Having done this, the equations become;

$$\Pr(\gamma = 2) = \frac{1}{1 + \ell^{\chi\beta^{(1)}} + \ell^{\chi\beta^{(3)}} + \ell^{\chi\beta^{(4)}}} \quad (\text{waged})$$

$$\Pr(\gamma = 1) = \frac{\ell^{\chi\beta^{(1)}}}{1 + \ell^{\chi\beta^{(1)}} + \ell^{\chi\beta^{(3)}} + \ell^{\chi\beta^{(4)}}} \quad (\text{other})$$

$$\Pr(\gamma = 3) = \frac{\ell^{\chi\beta^{(3)}}}{1 + \ell^{\chi\beta^{(1)}} + \ell^{\chi\beta^{(3)}} + \ell^{\chi\beta^{(4)}}} \quad (\text{waged/prp})$$

$$\Pr(\gamma = 4) = \frac{\ell^{\chi\beta^{(4)}}}{1 + \ell^{\chi\beta^{(1)}} + \ell^{\chi\beta^{(3)}} + \ell^{\chi\beta^{(4)}}} \quad (\text{prp})$$

Thus the relative probability of $\gamma = 4$, for example, to the base category ($\gamma = 2$) becomes;

$$\frac{\Pr(\gamma = 4)}{\Pr(\gamma = 2)} = \ell^{\chi\beta^{(4)}}$$

which is referred to as the relative risk ratio.

Using this specification we then proceed to estimate a pooled equation for the full EU-15 containing county specific dummy variables with Finland as our base country.

6. Results

The first point to note (Table VIII) is that personal demographics appear to play a relatively minor role in the determination of workers payment systems. Specifically, we identify absolutely no differences between pure prp and waged workers on age, gender, marital status, family or education. Where we do observe some differences are between waged workers and those with a wage and some element of prp. Here males are significantly more likely to be on wage/prp systems than solely wage systems. There was also some evidence, at the 10% level, that married, cohabiting and divorced people were more likely to be on mixed wage/prp systems. On balance, however, we can only conclude that personal characteristics of workers in the EU-15 do not materially affect the type of payment system they operate under.

Much the same can be said of industry sector. In this instance only agricultural workers were found to be significantly different in that they were more likely to receive pure prp or other non-standard payments. There was limited evidence to support the case that real estate workers favoured mixed wage/prp systems over fixed wage agreements. These findings cast considerable doubt on the IR schools fixation with prp in the manufacturing sector.

Employment contracts do matter, as predicted by the theoretical models of Lazear op. cit. and Haywood et al. op. cit. Here the self-employed were significantly more likely to use prp over wage systems, and permanent contract workers less likely to use pure prp systems. These results are consistent with the incentive-earnings effect which reflects a risk compensating differential and a pure effort effect.

Firm size was also an area which was found to affect payment systems. In particular micro (1–9 employees), small (10–99 employees) and to a lesser extent, medium-sized firms (100–499 employees) were less likely to use either pure prp or wage/prp systems than straight waged systems. This evidence suggests that the fixed costs of

TABLE VIII
Multinomial regression for payment systems (Base category = Wage system)

Payment system	Other		Wage/Prp		Prp	
Variables	RRR	z-stat	RRR	z-stat	RRR	z-stat
<i>Personal characteristics</i>						
Male	0.94	-0.54	1.72	4.44	1.07	0.59
Age	1.00	0.37	0.99	-1.59	1.00	0.22
Married	0.96	-0.31	1.31	1.8	0.86	-1.01
Cohabiting	1.04	0.18	1.43	1.85	1.17	0.72
Divorced	1.09	0.35	1.59	1.93	1.44	1.43
Split	0.96	-0.09	0.97	-0.06	0.70	-0.70
Kids	1.07	0.64	0.95	-0.48	0.92	-0.69
Degree	1.10	0.63	1.30	1.62	0.84	-1.06
A level	1.03	0.26	1.23	1.59	1.12	0.86
<i>Industry sector</i>						
Agriculture	2.38	2.86	1.07	0.17	2.51	2.68
Manufacturing	0.98	-0.09	1.32	1.35	1.37	1.15
Construction	0.72	-1.20	0.95	-0.19	1.36	1.05
Retail	1.44	1.62	1.29	1.15	0.93	-0.25
Catering	1.65	1.81	0.98	-0.08	0.89	-0.33
Transport	1.27	0.81	0.74	-0.15	1.16	0.45
Real estate	1.16	0.51	1.62	1.69	1.56	1.35
Other services	0.93	-0.30	0.72	-1.40	0.91	-0.34
<i>Employment contract</i>						
Self-employed	4.82	7.46	2.64	1.95	7.80	7.69
Fixed contract	0.17	-5.86	1.76	1.15	0.62	-1.54
Permanent contract	0.14	-9.36	1.99	1.47	0.34	-4.03
Temporary contract	0.36	-2.91	1.15	0.23	0.93	-0.21
<i>Firm size</i>						
0 employees	1.71	2.92	0.55	-1.88	1.05	0.23
1-9 employees	0.89	-0.76	0.63	-3.04	0.54	-3.81
10-49 employees	0.70	-1.91	0.71	-2.47	0.34	-5.43
50-99 employees	0.76	-1.08	0.56	-2.92	0.50	-2.83
100-499 employees	0.90	-0.46	0.85	-1.07	0.71	-1.72
<i>Occupation</i>						
Manager	0.87	-0.75	0.95	-0.22	0.57	-2.55
Professional	1.03	0.12	0.60	-1.77	0.97	-0.11
Technician	1.01	0.05	0.96	-0.16	0.82	-0.79
Clerical	0.51	-3.08	0.60	-2.33	0.43	-3.47
Sales	0.75	-1.49	1.32	1.35	1.15	0.67
Craft	1.08	0.44	1.06	0.30	1.35	1.65
Operative	1.17	0.65	1.51	2.03	1.11	0.43
<i>Job characteristics</i>						
Solve	1.30	1.69	1.10	0.63	1.27	1.52
Decision	0.88	-1.77	1.13	1.07	0.84	-1.59
Direct	0.62	-3.53	1.01	0.10	0.67	-2.98
Norms	0.91	-0.92	1.71	4.99	1.49	3.59
Order	0.92	-0.58	0.96	-0.35	1.22	1.33
Method	1.10	0.65	0.98	-0.18	0.94	-0.39
Learn	0.99	-0.05	1.30	1.99	0.75	-2.43
Consult	0.91	-0.89	1.45	3.45	1.07	0.57
Short	1.19	1.64	1.14	1.24	1.36	2.78
Quality	0.98	-0.22	1.27	1.75	1.20	1.43
Home	1.80	4.43	1.28	1.18	1.86	4.04
Tenure	1.00	-0.02	1.00	0.32	0.99	-0.93
Secure	0.63	-4.29	0.85	-1.30	0.59	-4.76

Table VIII (Continued)

Payment system	Other		Wage/Prp		Prp	
Variables	RRR	z-stat	RRR	z-stat	RRR	z-stat
<i>Country</i>						
Belgium	1.89	2.51	0.38	-4.04	0.18	-5.70
Denmark	0.68	-1.20	0.31	-4.48	-0.84	-0.76
Germany	1.26	0.95	0.41	-4.47	0.22	-6.53
Greece	0.50	-2.17	0.17	-3.95	1.80	2.58
Spain	1.08	0.31	0.81	-0.95	0.55	-2.65
France	0.82	-0.72	0.54	-2.78	0.18	-6.44
Ireland	1.83	2.11	0.14	-4.82	0.34	-3.67
Italy	1.92	2.62	0.64	-1.89	0.29	-4.95
Lux	1.76	1.40	0.36	-2.54	1.00	0.00
Netherlands	2.11	2.94	0.18	-6.81	0.17	-5.97
Portugal	0.42	-3.23	0.38	-3.59	0.52	-2.91
U.K.	0.78	-0.89	0.44	-3.56	0.13	-6.62
Austria	0.94	-0.22	0.71	-1.60	0.05	-6.77
Sweden	0.68	-1.23	0.54	-2.72	0.49	-2.85
<i>N Obs</i>	7623					
χ^2	4550.06					
Prob > χ^2	0.00001					
-2 LL	-4789.04					
Pseudo R^2	0.32					

Notes: Base Categories are as follows: Single marital status; O level education; Financial Services; Firm Size > 500 Employees; Occupation Unskilled; Country Finland.

designing and implementing prp systems are such that only large firms are able to operate them in a cost efficient manner by spreading the cost over more workers (Heywood et al., 1997).

On occupational status we observe that clerical workers are distinctly unlikely to be on any form of prp system. In addition, managerial staff are less likely to use pure prp systems over straight waged systems. Occupations where workers tended to use prp were plant & machine operatives, who favoured mixed wage/prp systems, and craft workers who used pure prp systems. One interesting non-result was that sales workers were no more likely to use prp over waged systems. Finally, professionals were less likely to use mixed wage/prp over straight wage systems.

Regarding specific job characteristics we identify many areas which determine the type of payment system workers receive. For example, workers under the direct control of their boss, are less likely to use pure prp systems. This is consistent with the monitoring argument under which closely supervised workers do not need to be incentivised to elicit high effort levels.

In work places where the pace of work is dictated by production norms, workers were significantly more likely to use prp, be it mixed or pure. The same was true for jobs which involved short, repetitive tasks but only for pure prp systems. This is consistent with ease of measurement of output. Not surprisingly, home workers were significantly more likely to use pure prp systems in line with incentivising and difficulty of monitoring arguments.

For mixed wage/prp systems we observe that workers have an increased probability in work environments where their jobs involve learning new things and where the industrial relations environment is such that workers are consulted over organisational change. The former result might suggest that firms are seeking to encourage workers to become efficient in new tasks and are designing appropriate incentive schemes to promote this. The latter result suggests that a climate of bilateral consultation can lead to increased worker effort without alienating the workforce.

Returning to the issue of expected tenure raised initially by looking at permanence of employment

contracts, we note that actual job tenure, a proxy for expected future tenure, has no effect on payment systems. However, workers who feel less secure in their jobs were significantly more likely to be on pure prp rather than waged systems. This latter result is consistent with the worker sorting argument.

Finally, we observe some very important differences across countries in payment systems. Using Finland as a base country, we observe that only Greek workers are more likely to face pure prp systems. With the two additional exceptions of Denmark and Luxembourg, workers in all other EU countries are less likely to be on pure prp systems. Considering mixed wage/prp systems, the differences are equally startling. In this case only Spanish and Austrian workers are as likely as Finnish workers to use this type of system, and all other country workers significantly less likely. These results serve to highlight some potentially important country specific differences in the way workers and firms determine the types of payment systems they operate under.

The relationship between firm size and PRP systems is fairly consistent in that the largest firms are significantly more likely to use either mixed wage/prp or pure prp systems. This is in line with Lazear's argument concerning fixity of costs of design and implementation of prp systems. Here, in large firms per worker costs are lower.

On worker participation in decision-making and organisational change we find evidence that offers support for the notion that managers can align worker and firm objectives through the use of PRP systems, and also for the notion that to carry change through workers need to be brought on board, or the firm faces potential resistance from workers (and also lengthy tenured managers).

We now present our findings against the initial; five hypotheses derived from the literature. To recap the five were:

- (I) The larger the employment size of the firm, L , the higher the probability that PRP systems will be adopted. This occurs as the design and implementation costs of a PRP system are spread over more workers (Heywood et al., 1997).
- (II) The shorter the expected tenure of workers, the increased probability of PRP. In our case we hypothesise that out temporary contract

workers have the highest probability of PRP, our fixed term contract workers the next highest, and our permanent contract workers the lowest incidence (Haywood et al., 1997).

- (III) Repetitive jobs permit greater use of PRP whereas a job with a wide range of tasks points to the use of basic pay (Ferne and Metcalf, 1997, p. 6).
- (IV) In situations where product quality is important, the incidence of PRP systems will be reduced (Drago and Heywood, 1995).
- (V) Where the pace of work is to a large extent dictated by production norms, the incidence of PRP systems will be reduced (Rebitzer et al., 1996).

On hypothesis (II) we offer three alternative tests. The first is type of employment contract. On this measure we find that the longer or more permanent the employment contract the lower the probability that workers will use PRP systems. Thus we find a degree of support for the tenure argument. Our second test of this hypothesis relates to job tenure. Here we find mixed evidence, thus we cannot support or reject the hypothesis that lengthier expected tenure of workers reduces the probability of PRP. Our final test relates to the employees perceived job security. Here we find a modicum of evidence that rejects the notion that job tenure reduced PRP. On balance the evidence is more supportive of the job permanence argument.

In this respect, the evidence suggests that PRP systems initially require workplace consultation and are associated with better workplace industrial relations via an alignment of worker and firm objectives.

Our third area of investigation is that of monitoring and measurement. From the literature we anticipate that PRP systems are most effective where output can be quantified and where on-the-job monitoring can be reduced. Our first factor is whether the pace of work is directly controlled by your boss. On this measure we find that PRP is negatively associated with direct control from the boss. Our second measure is whether work is characterised by repetitive tasks which might facilitate the use of PRP systems. Here we find that PRP systems are positively associated with workers performing short, repetitive tasks. Home workers, who might be construed as prime candi-

dates for PRP on the basis of unobservability of effort, were found to be associated with PRP. Taken in aggregate over the three measures we do find evidence to distinguish between workers on PRP and time rates from a monitoring and measurement perspective.

Finally, we focus on quality of output and job learning. The former provides an explicit test of hypothesis (IV). Yet once again we find sparse evidence to support the belief that quality concerns are important in relation to the adoption of PRP systems. Thus we can reject hypothesis (IV) on the evidence presented. Our last line of enquiry relates to the ability of workers to learn new things in the course of carrying out their day-to-day jobs. Here we identify negative PRP effects which implies that learning and employee development is not a significant factor in the PRP – time rate system decision for workers or firms.

6. Conclusion

We have presented exhaustive evidence relating to those factors which influence the decision to use PRP systems in EU countries. The results were then tested against the five core hypotheses drawn from previous work in this area. We find empirical support for three of the hypotheses, H:1 H:2 and H:3, which relate to firm size, permanence of employment, and job repetition. Other issues such as the organisation of production and the nature of the product or service were found to help determine the use of PRP systems across countries. On balance we find that the basic model put forward originally by Lazear and subsequently adapted by Heywood et al and further in this paper perform quite adequately.

Other important results, or in some cases non-results were that personal demographics such as age and marital status played no role. Education was not found to be important which tends to reject the view that PRP systems tend to reward unobservable worker ability. Yet sector featured highly. For example agriculture was found to have a high usage of PRP systems. Perhaps the most surprising result was that occupational status made little difference to the usage of PRP systems. Finally, there were important cross-country differences which merit further investigation in future work.

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Appendix

Variable definitions

Male	Coded 1 if male, else 0.
Age	Measured in years.
Married	Coded 1 if married, else = 0.
Cohab	Coded 1 if cohabiting, else = 0.
Divorce	Coded 1 if divorced, else = 0.
Split	Coded 1 if separated, else = 0.
Kids	Coded 1 if at least one child, else = 0.
Degree	Coded 1 if finished full-time education > 20 years of age, else = 0.
A Level	Coded 1 if finished full-time education between 16 and 19 years old, else = 0.
Agri	Coded 1 if agriculture, forestry, fishing, else = 0.
Manu	Coded 1 if manufacturing, mining, quarrying, else = 0.
Const	Coded 1 if construction, else = 0.
Retail	Coded 1 if retail, wholesale, repairs, else = 0.
Cater	Coded 1 if hotels, restaurants, else = 0.
Trans	Coded 1 if transport, communications, else = 0.
Estate	Coded 1 if real estate, else = 0.
Other	Coded 1 if other services, else = 0.
Fin	Coded 1 if financial services, else = 0.
SE	Coded 1 if self-employed freelance, else = 0.
FCE	Coded 1 if fixed term contract, else = 0.
PE	Coded 1 if permanent employment contract, else = 0.
TCE	Coded 1 if temporary contract of employment, else = 0.
SIZE0	Coded 1 if total employment in organisation is 0, else = 0.
SIZE5	Coded 1 if total employment in organisation is between 1 and 9, else = 0.
SIZE30	Coded 1 if total employment in organisation is between 10 and 49, else = 0.
SIZE75	Coded 1 if total employment in organisation is between 50 and 99, else = 0.
SIZE300	Coded 1 if total employment in organisation is between 100 and 499, else = 0.
Legman	Coded 1 if legislator, manager, else = 0.
Prof	Coded 1 if professional, else = 0.
Tech	Coded 1 if technician, else = 0.
Clerk	Coded 1 if clerk, else = 0.
Sales	Coded 1 if sales, servicing, else = 0.
Craft	Coded 1 if craft, related trades, else = 0.

Oper Farm	Coded 1 if plant, machine operator, else = 0. Coded 1 if agricultural, forestry, fisheries worker, else = 0.
SOLVE	Coded 1 if job involves solving unforeseen problems on your own, else = 0.
DECISION	Coded 1 if job involves deciding on departmental issues, else = 0.
DIRECT	Coded 1 if pace of work is dependent upon the direct control of your boss, else = 0.
NORMS	Coded 1 if pace of work is dependent upon production norms, else = 0.
ORDER	Coded 1 if you are able to choose the order of tasks, else = 0.
METHOD	Coded 1 if you are able to choose your methods of work, else = 0.
LEARN	Coded 1 if job involves learning new things, else = 0.
CONSULT	Coded 1 if you have been consulted over organisational change, else = 0.
SHORT	Coded 1 if work involves short, repetitive tasks of less than 10 minutes, else = 0.
QUALITY	Coded 1 if job involves meeting precise quality standards, else = 0.
HOME	Coded 1 if home worker, else = 0.
TENURE	Years in current employment.
SECURITY	Coded 1 if you have a secure job, else = 0.

Note

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References

- Aldrich, J. H. and F. Nelson, 1984, *Linear Probability, Logit and Probit Models*, Newbury Park, CA: Sage Publications.
- Booth, A. L. and J. Frank, 1996, 'Performance Related Pay', *ESRC Research Centre on Micro-social Change Working Paper No. 96-14*. University of Essex, England.
- Brown, C., 1990, 'Firms' Choice of Method of Pay', *Industrial Labour Relations Review* **43**(3), 165s-182s.
- Brown, M., 1997, 'Performance Pay Choices: Evidence from Certified Agreements', *The Journal of Industrial Relations* **39**(3), 349-368.
- Cowling, M., 2000, 'Performance Related Pay in Belgium and the Netherlands', *Applied Economics Letters* **7**(10), 653-657.
- Cowling, M., 2000, 'The Extent and Determination of PRP Systems in Scandinavian Countries', *Applied Economics*, forthcoming.
- Drago, R. and J. S. Heywood, 1995, 'The Choice of Payment Schemes: Australian Establishment Data', *Industrial Relations* **34**(4), 507-531.
- Drago, R., 1991, 'Incentives, Pay, and Performance: A Study of Australian Employees', *Applied Economics* **23**, 1433-1446.
- Edwards, P., M. Collinson and C. Rees, 1998, 'The Determinants of Employee Responses to Total Quality Management: Six Case Studies', *Organization Studies* **19**(3).
- Eisenhardt, K. M., 1988, 'Agency and Institutional Theory Explanations: The Case of Retail Sales Compensation', *Academy of Management Journal* **31**(3), 488-511.
- Fernie, S. and D. Metcalf, 1997, '(Not) Hanging on the Telephone: Payment Systems in the New Sweatshops', *Centre for Economic Performance Working Paper 891*, London School of Economics.
- Garen, J., 1994, 'Executive Compensation and Principal-Agent Theory', *Journal of Political Economy* **103**, 1175-1199.
- Goldin, C., 1986, 'Monitoring Costs and Occupational Segregation by Sex', *Journal of Labor Economics* **4**(1), 1-27.
- Greene, W., 1997, *Econometric Analysis*, 3rd ed., New Jersey: Prentice Hall.
- Heywood, J. S., 1998, 'Women and Variable Pay: Tenure, Risk Attitude or Flexibility?', University of Wisconsin, Milwaukee, Working Paper.
- Heywood, J. S., W. S. Siebert and W. Xiandong, 1997, 'Payment by Results Systems: British Evidence', *British Journal of Industrial Relations* **35**(1), 1-22.
- Heywood, J. S., O. Hubler and U. Jirjahn, 1998, 'Variable Payment Schemes and Industrial Relations: Evidence from Germany', *Kyklos* **51**, 237-257.
- Heywood, J. S. and X. Wei, 1997, 'Piece-Rate Payment Schemes and the Employment of Women: The Case of Hong Kong', *Journal of Comparative Economics* **25**, 237-255.
- Hutchens, R. M., 1987, 'A Test of Lazear's Theory of Delayed Payment Contracts', *Journal of Labor Economics* **5**(4), pt 2, S153-S170.
- Ichniowski, C. and K. Shaw, 1995, 'Old Dogs and New Tricks: Determinants of the Adoption of Productivity-Enhancing Work Practices', *Brookings Papers: Microeconomics*, 1-65.
- Lazear, E. P., 1995, *Personnel Economics*, Cambridge, MA: MIT Press.
- Lazear, E., 1979, 'Why Is There Mandatory Retirement?', *Journal of Political Economy* **87**(6), 1261-1284.
- Lazear, E., 1986, 'Salaries and Piece Rates', *Journal of Business* **59**(3), 405-431.
- Lazear, E., 1996, 'Performance Pay and Productivity', Working Paper 5672. NBER.
- Roumasset, J. and M. Uy, 1980, 'Piece Rates, Time Rates, and Teams', *Journal of Economic Behaviour and Organization* **1**, 343-360.
- Royalty, A. B., 1998, 'Job-to-Job and Job-to-Nonemployment Turnover by Gender and Educational Level', *Journal of Labour Economics* **16**(2), 392-443.
- Seiler, E., 1984, 'Piece Rate vs Time Rate: The Effect of Incentives on Earnings', *The Review of Economics and Statistics* **LXVI**(3), 363-375.

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