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Workplaces in the Education Sector in the United Kingdom: How do they differ from those in other industries?

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Abstract – A significant body of literature suggests that enterprises in the public education sector may differ from ‘standard production’ market firms in important ways. Substantial government involvement is then legitimized. However, this literature often uses within-sector comparisons of school types, rather than cross-sector comparisons of the education sector with other sectors. This paper compares the structure of education enterprises and workplace practices with those in other industries, namely (the rest of) the public sector and the private sector. Key differences – particularly as regards staffing resources – between education providers and these other enterprises are identified from prior literature and then tested. Data from the UK Workplace Employee Relations Survey (1998) are used. Our findings show substantial differences in labor rewards and factor management in the education sector. The WERS98 has been provided by the Data Archive at Essex University.

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1. Introduction

Education enterprises are assumed to differ from private sector firms in a diverse number of ways, with such differences typically assumed to reflect the – necessarily – weaker pressures on internal efficiency in the education sector (see Hoenack, 1994). However, these different pressures are often identified through comparisons between public and private schools or within schooling systems (Chubb and Moe, 1988; Levacic and Hardman, 1999). Such comparisons are most suited for identifying either the particular organizational characteristics which make some schools more efficient and effective than others or the behavior of private schools in relation to public schools (Tweedie, 1990; Downes and Greenstein, 1996). A more general comparison is between non-market education enterprises and private market firms in other sectors. This juxtaposition (albeit often implicit) then serves to legitimize government provision of education, as well as influencing how it is funded and regulated.

These aspects – public funding, regulation and provision – are far more wide-ranging (and diverse) in their influence on the education sector than, say, encouraging more open enrollment for popular public schools.¹ Our inquiry therefore has a number of ramifications. Differences between market and non-market contexts may shed light on the international variations in the public/private mix of provision (James, 1993; Ambler, 1994). Comparisons between market and government sectors may also be related to sectoral privatization (efficiency gains from large-scale privatization are estimated by Megginson et al. (1994) and Lopez-de-Silanes (1997), although not for the education sector). If inter-sector investigations do reveal higher performance in one sector, then it is not sufficient simply to identify this; it is also necessary to explain using tangible input and process measures.

¹ In discussions of why education is publicly provided, Lott (1987) focuses on public indoctrination, whereas Brown (1992) describes how curriculum uniformity is a response to student uncertainty.

Finally, cross-sector comparisons may reveal alternative patterns yet similar consequences: the education sector may be competitive but through non-price rather than price factors; or accountability may be obtained through managerial labor contracts rather than through product quality (for discussion of pricing mechanisms in non-profit enterprises, see Steinberg and Weisbrod, 1998). All these issues are pertinent to understanding the technology of the education sector.²

Yet the private firm – public school comparison has not been explicitly and directly attempted. Instead, partial arguments on the relative inter-sector efficiencies of enterprises have been offered (examples are given below), along with refractory citations of where markets have arisen to meet demand (e.g. Sperling, 1998). It is not obvious what may be generally concluded from such evidence. Rather, a comprehensive assessment of the factor usage, workplace conditions and organizational structure of education enterprises is necessary. This paper offers an inter-sector comparison to identify the substantive differences between education providers and other firms.

We begin by describing the available data. We then stylize the typical production function in the education sector, identifying differences both within the education sector and across sectors. This stylization – across inputs, processes and outcomes – yields a number of testable hypotheses; managers’ and employees’ self-reported survey responses are then used to test the emergent hypotheses. A final section offers a conclusion.

² Moreover, inter-school comparisons may be problematic, with school success depending on pupil intake, curriculum, intake policies and on religious affiliation (Teddlie, 1990; see also the criticisms of outcome measures used by Chubb and Moe (1990) in the review by Bryk and Lee, 1992). Also, schools make strategic responses to other schools, which may yield a spectrum of schooling provision: little can therefore be inferred from evidence that some schools are more effective than others, when such effectiveness is endogenous to enrollees’ variegated preferences. Finally, the focus here is on inputs and processes, rather than (often subjective) output measures (see Frey, 1992).

2. The Workplace Employee Relations Survey

The data used to test the hypotheses come from the Workplace Employee Relations Survey (WERS), undertaken in the UK in 1998. This survey has information on 2191 enterprises across all sectors of the economy, taken from interviews with workplace managers. The broad topic of the survey is ‘The Management of Employees’, and it contains information on workplace characteristics including consultation, representation, disputes, performance and flexibility. Within each workplace, a random sample of up to 25 workers completed a self-report questionnaire on the terms and conditions of their job: 28123 workers submitted information.

The survey categorizes workplaces into ten sectors of the economy: manufacturing; utilities; construction; wholesale; hotels and catering; transport; financial sector; other businesses; public authorities; education; health; and other companies. Here we collapse the sectors into *education*, *other public* (public authorities and health), and *private*. For estimation, this yields 169 public sector education enterprises, 346 public enterprises and 1127 private enterprises. These education enterprises may range from primary schools to training centers (the dataset also has 42 private sector education workplaces, which are introduced in the later worker-level analyses). However, the key interest is on the technology of education provision and the extent to which it can be stylized. Hence it is legitimate to work with a generic category of ‘education sector’. From the worker database, 2903 (617) are in public (private) sector education workplaces, 6327 in the public sector and 16643 in private enterprises. All analyses are weighted to reflect the sampling frame.

The WERS dataset is ideal for direct testing of the differences between the education sector and enterprises in other sectors. The sampling frame is consistent across the sectors, draws from the whole of the UK, and applies harmonized questions to all enterprises. The sample of education enterprises is reasonably large; with up-to-date information collected in

1998, it is also possible to see whether substantial differences remain after two decades of liberalization across the public sector.

For our estimation, we test for the statistical significance of the education sector, relative to other sectors, against an array of dependent variables. Probit and ordinary least squares estimation is used in the Tables, as appropriate. Also, we adjust throughout for workforce composition, as this may reflect the differences in preferences and availability of workers across each sector and it allows us to focus on differences in processes and organizational systems across the sectors.

The WERS dataset includes information on the proportions of workers who are: skilled manual, part-time, female, ethnic minority and older than 50. The dataset also includes average years of education (calculated from occupational averages) and average tenure (calculated using self-report data from the random sample of workers at each workplace). The frequencies for these variables are detailed in appendix A1: education sector workplaces use more educated workers, more female workers and have longer tenure. The use and choice of such controls has been well debated, as such 'controls' may be endogenous (Teddlie, 1990; Chubb and Moe, 1990); *a priori* signing of characteristics, e.g. tenure, may also be difficult. However, the inferences we are able to draw are largely unaltered, with or without controls; in most estimations below, we therefore report only the coefficients on the key sectoral variables.

Using these data, in the next Section we stylize the education production function at the workplaces and the implications for workers. This stylization yields testable hypotheses across a range of process domains.

3. Estimation and Testing

3.1 Labor Usage and Rewards

Table 1 reports the first set of estimations, where the education sector and public sector are dummy independent variables against the default category of the private sector. Statistically significant coefficients indicate differences across the sectors.

An obvious difference between the education sector and other industries is in the (priced) input mix, critically the reliance on labor for instruction in education sector firms (Tsang, 1988; Hanushek, 1998). The proportions of total costs expended on labor should be relatively high in education enterprises and we test this labor-intensity through reports of proportions of the establishments' sales/revenue costs being accounted for by labor. These proportions are banded: 0-25%, 25-50%, 50-75% and >75%. We estimate the probability that all types of enterprises will be in the lowest band, i.e. have less than 25% of their costs accounted for by labor (The inferences are not sensitive to the choice of band). Row 1 of Table 1 shows, as anticipated, that education enterprises are statistically significantly more likely to incur a greater proportion of costs on labor. Such labor-intensity guides many of our subsequent hypotheses on labor organizations.

Given capital-labour ratios, education enterprises might employ different types of labor to other enterprises. Brewer (1996), analyzing (non)-instructional expenditures across 700 New York school districts, refers to an 'administrative blob': rule-enforcing educational administrators may constrain efficiency. Such evidence indicates that, within the education sector, more administration means lower performance, yet it cannot be inferred that education providers are more 'blob-like' than the private sector. Rather, Good and Braden (2000) argue that the proportions of administrative staff rise with greater privatization (of education). Here, we can test whether – at the workplace level – education providers do devote more resources to administration and general management than private firms. Using

the proportions of managers and administration/clerical staff against total employment, row 2 of Table 1 shows that the blob hypothesis cannot be supported, at least within the workplace: education enterprises report lower percentages of managerial or clerical staff. (Although we appreciate that this blob may be at a higher level within the organization than the workplace, private corporations may themselves have many layers of control).

Finally as regards input usage, education enterprises may offer longer contracts to staff, with greater guarantees of job security (for higher education, see Ehrenberg et al., 1991). This contractual argument may be tested in that education enterprises will have: (a) lower proportions of employees made redundant in the last 12 months; and (b) higher probabilities of having a policy of guaranteed job security or no-compulsory redundancies for any occupational groups. For both hypotheses, there is no evidence of lesser redundancies or greater security in the education sector (estimation not reported here).³

As well as usage, the payments to factors may be less efficient than in the private sector; efficient payments – those that accurately reward effort and ability – are especially important when the organization is highly labor intensive. Typically, salaries across the teaching profession are (assumed to be) compressed, leading to: adverse selection across school subjects as the opportunity costs of a teaching career vary (for the US, Walden and Neumark, 1995; Lankford and Wyckoff, 1997; Southwick and Gill, 1997); distortions in the hiring market for teachers (see Ehrenberg and Brewer, 1995; Ballou, 1996); and dampened tournament effects on labor productivity (Prendergast, 1999). However, wage compression

³ In addition, education enterprises may over-use labor through their overtime payments and the length of the working week (Ballou, 1995, looks at teacher moonlighting; on deployment, see Dolton, 1996). The likelihood of labor overuse is partly related to the volatility of the product market, but it may also reflect difficulties in obtaining suitable physical capital. However, the evidence from the WERS is conflicting: the probability of more than 80% of workers working overtime is *higher* in the education sector, as reported by the manager; estimation of the average working week per employee is no different across sectors; and the incidence of overtime is *lower* in the education sector (male employees only), as reported by the employees. Results available from the authors. Overall, no clear cross-sector difference in overtime and/or hours worked is discernible.

in education may be necessary to ameliorate any sabotage or lack of cooperation amongst workers caused by invidious pay systems. Row 3 of Table 1 reports the coefficient of variation of pay within the firm as the dependent variable (using OLS). As hypothesized, the independent variable denoting education enterprises is statistically significant and negative: education enterprises have a lower spread of wages than workplaces in the private sector.

Relatedly, labor-intensive education enterprises may face Baumol's relative price effect. Such services will (over time) absorb an increasing burden of resources and face greater increases in costs, because the production function cannot be augmented with technology and physical inputs. We test this by looking at declarations of managers as to the rate of change of labor costs; the results are reported in Table 1, column 4. Based on the reports of the managers, however, no statistically significant relationship between changes in labor costs and the education sector is evident.

Finally, information on stress levels are available. Stress levels will be determined by a range of factors, but may indicate a payment structure that over-emphasizes pecuniary rewards over non-pecuniary. Highly-stressed workers may prefer less pay and instead more within-workplace expenditures which serve to reduce such stress. From row 5 of Table 1, education enterprises appear more likely to have employees reporting stress at work, suggestive of a pay structure skewed toward extrinsic, rather than intrinsic, rewards. More evidence on these issues is reported with worker-level data below.

3.2 Managerial Processes

Management and deployment of the workforce are critical for labor intensive sectors. Indeed, Vining and Boardman (1992) emphasize that enterprise control structures may be as important as competition in ensuring internal efficiency. For education, Chubb and Moe (1988) contrast US public (government), Catholic, private and elite schools and identify

bureaucratic government influence on the school board, the administration of school policies and deployment of personnel. Across the education sector, there may be less scope for managers to influence relatively autonomous professionals. As a corollary, managers may be unable to introduce changes to workplaces where technologies, e.g. curricula and assessment, are standardized (Shleifer, 1998). Here several issues are considered: the quality of management inputs; manager–worker relations; training; and monitoring of workers.

First, the quality of management inputs will be important (see Brewer, 1993; Ballou and Podgursky, 1995). However, such skills and entrepreneurship may be limited in the public education sector by funding formulae (and by the practice of promoting instructors into managers). Where such formulae are imposed in a cost-plus manner, then managers may have no incentive to reduce costs; rather, greater managerial scope may be possible when formulae are fixed-price and rents can be obtained for the enterprise. For larger education institutions, responsibility budgeting – where departments retain any generated revenues – may promote managerial skills (as opposed to block allocations, see Johnes, 1999). Our tests report on managerial credentials and the extent to which authority is delegated. Rows 1 and 2 of Table 2 show that, adjusting for workforce composition, enterprises in the education sector are less likely than the private sector to employ managers who have formal qualifications in the management of personnel and are less likely to cede supervisory authority for employee selection (hiring and firing). Also in row 3 of Table 2 we find that training in education enterprises is more widespread than in the private sector. Such training may be one way of sharing skills and encouraging workers (albeit without giving them managerial autonomy).

Workforce relations are also considered. In their comparison, Chubb and Moe (1988, 253) consider the characteristics and experiences of the principals and relations

between staff (on satisfaction, see Lillydahl and Singell, 1993). Looking across sectors, the positive coefficient given in row 4 of Table 2 shows education enterprises are more likely to record management relations as '(very) good'. (These manager reports are corroborated using worker-level data below).

Managerial control through monitoring may also differ across sectors: education enterprises may declare weaker or a different form of monitoring (e.g. teamwork instead of direct supervision) as a recognition of professionals' autonomy. Alternatively, there may be substantial monitoring in education systems through government accountability mechanisms (for the UK, see Fitz-Gibbon, 1996). These mechanisms may be greater than market domination. Table 2 shows our tests for the incidence of these different forms of monitoring. The hypothesis of lower monitoring in the education sector should be rejected. Using as a dependent variable either (a) the individual as the unit for monitoring, (b) multiple types of monitoring or (c) team-working, then education workplaces appear to be more highly monitored than those in both the private and other public sectors. (Other evidence – based on the discretion afforded to workers – shows no sectoral differences).

3.3 Incentives and Competitive Pressures

Because teaching is held to be a vocation/profession, teaching staff may be subject to lesser incentives (for a general discussion, see Prendergast, 1999; on US and UK education, see Bishop, 1996, and Fidler et al., 1998). Alternatively, incentive systems in education may be sufficient: Burgess and Metcalfe (1999) cite research assessments in UK higher education as department-level incentives which have in turn created incentives related to individuals' performance. Milanowski (2000) identifies how effective performance awards need, *inter alia*, to make explicit and more certain the link between goals being achieved and teacher effort, along with teacher expectancy that such rewards are delivered. However, the

efficacy of such awards in education may be compromised by: unclear maximands, political change and student variability. In the WERS dataset, the incentives that can be measured are performance-related pay and a range of pay-setting formulae based on identifiable worker criteria.

The evidence across Table 3 shows a clear difference between education enterprises and the private sector. The incidence of pay formulae which principally reward effort – either reflecting hours of work, employees’ skills, an explicit incentive scheme or a formula where performance and pay are clearly linked – are much less prevalent in the education sector. The coefficients are negative and statistically significant. As contrast, the incidence of pay formulae which reward time served and formally demarcated tasks – credentials, job grade and years of service (but not age) – are higher in the education sector. These results tally with Burgess and Metcalfe (1999), using UK workplace data from 1990, who find significantly higher incidence of performance-related pay and merit pay in the private sector.⁴ US evidence also indicates lower incidence of merit pay for teachers, as well as the difficulties in introducing such schemes (Ballou and Podgursky, 1997).

Often, criticisms of the internal efficiency of education providers begin in terms of their low performance: inefficiencies are then reverse-inferred from poor outcomes. One condition for public provision may be where pressures for innovation are weak (Shleifer, 1998). X-inefficiency is also cited, i.e. that education providers have unclear performance targets, with numerous objectives and with budget shortfalls potentially underwritten. However, performance in the private sector may be just as poor. Conventionally, creative

⁴ Salaried work is more likely to be chosen over performance-related pay either (a) where there are high monitoring costs (because of multiple tasks); or (b) where unobserved ability is a weak determinant of pay and observed ability a relatively strong one; or (c) where workers are risk averse (Booth and Frank, 1999). Evidence of (a) especially for education has already been rejected; hence the tests in Table 3 may indicate the relative importance of unobserved ability or risk aversion. Other explanations for performance-related pay versus

destruction and competitive pressures should keep such companies efficient; yet these are long run impulses and at any time there may be substantial inefficiencies that go unchecked (because of barriers to entry, restrictive practices or special interest legislation). Political controls could be as effective as corporate/market controls (although Vining and Boardman's (1992) evidence shows the latter to be more efficiency-enabling).

Greater levels of x-inefficiency can be tested by looking at the types of targets used in the education sector. Rows 1–3 of Table 4 indicate that the education sector differs from the private sector in its reliance on outcome measures (the quality of service/product) rather than costs or productivity measures.⁵ On competition, the evidence appears as expected. Row 4 of Table 4 shows that competitive pressures are weaker in the education sector: fewer managers report such pressures being '(very) high'. (Also, the average years of operation of enterprises in the education is substantially longer than in the other sectors, suggestive of some cushion against closure). However, an alternative test draws on manager reports on the extent of change within the sector. Such change may either be external – changes in the market structure – or internal – pressures for greater productive efficiency. Three binary variable measures of change (within the last five years) are available: whether the manager feels there has been a lot of change; whether at least four organizational changes have been introduced; and a variable indicating where it has not been possible to introduce change. As reported in rows 5–7 of Table 4, none of these variables are statistically significant for the education sector. At least according to the managers, the incidence of change appears to be spread across the economy.

salaries – e.g. the percentage of managers/supervisors, employee size and occupational mix – are included in the controls noted at the foot of each Table (Burgess and Metcalfe, 1999).

⁵ It is then moot which targets optimize the performance of the enterprise. Labor management may indeed be complex within state-owned enterprises: Lopez-de-Silanes (1997) finds that restructuring of labor usage prior to privatization actually reduces the offer price at which the enterprise is privatized.

3.4 Unionization

Education enterprise unionization may be an important influence on performance and organizational characteristics, particularly as unionization is high within the teaching profession (Dolton and Robson, 1996). High unionization is evident from the WERS data: row 1 of Table 5 shows that enterprises within the education sector are significantly more likely to recognize, negotiate and consult with unions.

Of more interest is the role which unions play in the key process decisions within the workplace. Unions may be efficiency-enhancing, in that they can trade their information set based on workers' skills and preferences with management (Hoxby, 1996). However, unions may also be obstructive, using their (monopoly) control over the workforce to reduce the overall surplus and capture rents. One possible test as to whether the negative or positive effects of unionization are evident is in the preferences of managers. The results on this are equivocal: using the full sample of enterprises, more managers in the education sector prefer unions; however, using only union firms, no clear cross-sector preference emerges (estimations not reported here). Further information on the behavior of unions in the education sector is presented in rows 2–4 of Table 5. Looking only at union firms, those within the education sector are more likely to be involved in negotiation over performance appraisal, being no more likely to negotiate over personnel or pay and payment systems. (This last result is plausible: in UK schooling, for example, teacher pay is guided in part by a national pay review body). Hence it is in the evaluation and so deployment of staff rather than the payment of staff where the strongest union effects might be expected within the education sector.

3.5 Pay Levels Across Individual Workers

We now turn to workers' evidence about their terms and conditions within these enterprises. Again, a detailed number of control variables are available for each worker on occupation, tenure and personal characteristics. Here, the private sector is divided into 8 categories, with the default category being manufacturing; we also introduce data on workers from workplaces in the private education sector (The findings reported below are unchanged when only the basic three sectors are used). Table 6 reports a basic Mincerian earnings function, with the log of the hourly wage as the dependent variable. The estimation shows that education sector workers' earnings – both for those in the private sector and those in the public sector – are relatively low: they earn 10%–19% less than manufacturing and financial services workers, although more than those in the hotels/catering and wholesale/retail sectors. This discount – adjusting for individual characteristics – may be a consequence of government monopsony power (Bee and Dolton, 1995) or market failures in pricing the efforts of education workers undertaking diverse, numerous tasks.⁶ Controlling for a substantial array of personal characteristics, pay appears to be no different across the private and public sectors.⁷

Further wage estimation looks more directly at unions. Although unions may raise earnings in education (for evidence, see Ashraf, 1992), specific criticisms are only legitimate if the union premium is relatively high in the education sector. Table 7 reports estimations

⁶ These low wages may therefore explain rational low effort by those in the education sector. (Although effort may be contingent on lifetime earnings as much as current earnings, further estimation shows that, at least for males, the earnings discount to working in the education sector is higher for workers aged over 40 than for the full sample. The inferences regarding relative effort levels are therefore unlikely to be overturned).

⁷ As a further test, we separated out the education sector workers who identify themselves as in professional or technical occupations; these are more likely to be teachers or lecturers. Wage equations for these 675 (1136) workers are available on request, including worker and workplace characteristics. Older workers earn more, as do those with degrees and union members. However, the workplace characteristics do not carry much explanatory power: earnings are not significantly higher for workplaces which are in the private education sector, have more female workers, are more competitive, larger or operate performance-related pay schemes. For males, there is some support for tournament theory determination of wages (through motivational

of the effects of unions on pay per hour, split by gender and sector. There is no evidence that unions are relatively more effective at raising pay levels within the education sector, compared to other sectors: the union premium is lower for education workers, either male or female. (Other estimations – (a) measuring whether workers feel unions are their most appropriate representatives or (b) interacting unionization with sector in an aggregated model – yield similar findings). These results may be anticipated, given the above evidence that unions in the education sector are no more predisposed than other unions to bargain over pay. In distinction, Dolton and Robson (1996, 548, Table 1) find the wages of UK teachers (relative to wages of whole economy average earnings) are positively influenced by the Herfindahl Index of teacher trade union concentration. However, their estimation suggests this is a short run effect, and that excess demand for teachers has the most influence on relative earnings. We take this as corresponding with our results, where the union premium is no different for the teaching profession than for other professions.

3.6 Worker Benefits Across Sectors

In addition, we test for non-pecuniary compensating differentials and worker attitudes. Table 8 reports on a series of ordered probit estimations of satisfaction with the job and other non-pecuniary characteristics of work. Sectoral dummy variables (7) are included and column 2 reports the coefficient for the dummy for workers in the public education sector. Looking at the top half of Table 8, the distinctiveness of the education sector emerges clearly: employees report the highest levels of respect from their managers and the sense of achievement they get from their work. Perhaps as an explanation of these differentials, there is significant dissatisfaction with the amount of pay received. Regarding

pressures or through lower dispersion of tasks): own wage is a positive function of the workplace that is professional.

influence over the job, the effects appear to be neutral across the sectors. In the fifth row of Table 8, as was found using workplace-level data, employees in the education sector report the highest levels of stress (worrying about their job outside working hours).

The bottom half of Table 8 explores non-pecuniary issues. Again the education sector appears to be the outlier sector. Notably, workers in the education sector report relatively high propensities: to share the values of their organization; to have managers who are understanding about family responsibilities; and to feel loyal to their organization. Also strongly positive are reports that the enterprise encourages people to develop their skills. For female employees at least, those in the education sector are relatively proud to tell people who they work for. These appear to be substantial non-pecuniary rewards, which perhaps may serve (better than pay) as part of the performance-related rewards for effort: workers who empathize with each other may be less likely to sabotage others' productivity. Alternatively, these more harmonious workplaces may signal a lack of peer pressure, implying weaker incentives.

3.7 Modeling Performance

The preceding analysis has addressed process issues, comparing across sectors. Ultimately, though, investigation into the education production function should be driven by what works in enhancing performance. Here we narrow our focus to only the education enterprises and investigate two performance measures: reports on the quality of product/service; and average wages.

Managers were asked to report the quality of service, compared to other establishments in the industry. Responses were either '(a lot) better than average', 'about average' or '(a lot) below average'. This variable was transformed into a binary variable, with a value 1 if above average or gone up, zero otherwise. This transformation yields 14.8% of

managers reporting their workplace offers a relatively high quality product. Probit estimation is applied to this dependent variable. In contrast to this subjective measure, the second measure is the (log of) the average wage of the workplace; average wages may reflect internal efficiency across the workplace. Ordinary least squares estimation is applied here (with the control variables included). Each of the independent variables discussed above was included in the initial estimation: stepwise elimination yielded the more parsimonious model reported here. The results are reported in Table 9 for 193 (203) workplaces.

First, the evidence presented earlier shows education enterprises to be labor intensive; whether this is an efficient factor mix depends on how greater labor intensity impacts on performance (see cost-effectiveness ratios reported in Pritchett and Filmer, 1999). However, our estimation could not find that the proportions of costs expended on labor were at all systematically related to the outcome variables (results not reported here).

Second, a sizable amount of evidence exists on the scope for education providers to expand and improve performance, with educational enterprise size strongly positively related to superior outcomes (Bradley and Taylor, 1998; Johnes, 1997). However, our results in Table 9 show no link between the number of workplace employees and either service quality or wages.

Third, as regards competitive pressures, there is substantial literature which reports evidence of the beneficial effects of competition (summarized in Belfield, 2000). Including managers' assessment of the competitiveness of the market, greater competition appears to have a negative effect on quality and average wages. In the UK, competition may serve as a way of reducing union power. Relatedly, we compare the education enterprises in the private versus the public sectors. Average wages appear equivalent (corroborating the evidence of Table 6); but managers of private enterprises report their relative better quality

of service. These results contrast with US evidence from Vedder and Hall (2000): salaries for teachers are enhanced both for those working in the private education sector and where private school competition is greater (although Ballou and Podgursky, 1997, report significantly lower salaries in the private sector).

Fourth, we investigate some of the pertinent process variables to emerge from our earlier estimations. Performance-related pay is positively correlated with wages but not service quality. The ability of supervisors to hire/fire and the use of costs targets appear to have little effect on outcomes; managerial qualifications appear negatively correlated with quality (and possibly wages). Plausibly, higher average tenure, proportions of male workers and proportions of professional workers raise average wages.

Finally, evidence from Table 7 suggests unions do raise salaries across all sectors, but not noticeably more in the education sector. Yet Eberts and Stone (1985) report generally adverse effects of unions on labor productivity or enterprise performance within the US education sector; Duplantis et al. (1995) report the upward pressure on costs. A critical test is therefore the effect of unions on the performance of the enterprise. Table 9 offers some corroboration of previous evidence: the union coefficient raises wages, but also reduces the likelihood that the quality of service would be better than average (here union is classified at the workplace level, although other classifications yield similar results).

4. Conclusion

This inquiry has been about internal efficiency, not external efficiency; a cost–benefit analysis for market over government provision has not been undertaken. Whatever education enterprises produce (as their external outputs), we assume that these are the appropriate outcomes. Rather, taking these outcomes as given, it is legitimate to investigate whether and how education providers appear to be internally different from other

enterprises, i.e. whether and how political control is substantively different from private corporate control. Unless such differences do exist, then claims to explain the inefficiency of education enterprises in terms of organizational characteristics are not legitimate. But, even if staff deployment, monitoring, etc., were equivalent across the sectors, this need not imply private provision or funding: education may still be deemed a merit good.

In fact, we have found substantial differences across the sectors. These differences are primarily labor-related – pay, workforce composition, bargaining and incentives – rather than sectoral or control-related (e.g., sector volatility, technical change, monitoring and enterprise change). These results may show the conundrum of explaining the relative performance of education enterprises: provision is relatively labor intensive and the organizational characteristics which reveal abilities and motivations are notably distinct from those employed in the private sector. Within the education sector, however, some organizational characteristics (such as unionism or performance-related pay) have similar effects as they do in the private sector. Hence, it may be education employees who have different utility functions to those in the private sector, or it may be the different institutional context which encourages these workers to behave in particular ways; the evidence here suggests that both these arguments have merit. Even this, though, should be carefully interpreted: all that has been established here is the difference between the two sectors; not the relative performance of each.

Yet the above evidence may be useful in a number of ways. It is illustrative of how much different – in terms of processes and management – private sector enterprises are to those in the education sector. It can be related to policy within the teaching profession (Bryk and Lee, 1992, emphasize teacher collegiality; see also Keep, 1993). In terms of method, this aggregated, cross-sector approach triangulates with evidence directly from

within the schools sector (Levacic, 1998) and fits with the call for wider measures of effectiveness by educationists (Coe and Fitz-Gibbon, 1998). Finally, it is informative as to the extent to which private market imperatives – and the workforce deployment and organizational implications these convey – have been introduced into education enterprises.

Table 1
Inputs: Capital and Labor
(probit, rows 1, 4; OLS, rows 2, 3, 5)

	EDUCATION: COEFFICIENT (S.E.)	PUBLIC SECTOR: COEFFICIENT (S.E.)
Labor costs <25% of operating costs	-1.1302 (0.1864)**	-1.0166 (0.1221)**
% of workforce managers or clerical	-0.2700 (0.0317)**	-0.0487 (0.0357)**
Coefficient of variation in pay†	-0.0766 (0.0236)**	-0.1153 (0.0221)**
Labor costs increased over past 5 yrs	0.4381 (0.2485)	0.5720 (0.1786)**
% of employees reporting stress	1.0398 (0.2395)**	0.6604 (0.1986)**

Huber-White standard errors in parentheses. All data are weighted. Also included in each row estimation are variables for years of education per worker; ln(employees); ln(employees) squared; % skilled manual workers; % part-time workers; % female workers; % workers over 50; % ethnic minority workers; and months tenure per worker. Default sector is private enterprise.

* significant at 5% level; ** significant at 1% level

Number of workplaces =1642. † Number of workplaces =1566

Table 2
Managerial Capability and Control
(probit)

	EDUCATION: COEFFICIENT (S.E.)	PUBLIC SECTOR: COEFFICIENT (S.E.)
Manager has formal personnel qualifications	-0.2490 (0.1459)*	0.4413 (0.0993)**
Supervisors have authority on hiring/firing	-0.7236 (0.4246)*	-0.2744 (0.1669)
Training for >60% of workers	0.9533 (0.2192)**	0.7594 (0.1677)**
Relations with management very good	0.3042 (0.2411)**	-0.1817 (0.1666)*
Monitoring: Individual employees	0.7189 (0.2373)**	-0.0430 (0.1772)
Monitoring: Multiple methods	0.7590 (0.2374)**	0.0933 (0.1756)
Teamwork	0.8253 (0.2692)**	0.7023 (0.1915)**

Huber-White standard errors in parentheses. All data are weighted. Also included in each row estimation are variables for years of education per worker; ln(employees); ln(employees) squared; % skilled manual workers; % part-time workers; % female workers; % workers over 50; % ethnic minority workers; and months tenure per worker. Default sector is private enterprise.

* significant at 5% level; ** significant at 1% level

Number of workplaces = 1642.

Table 3
Pay Formulae
(probit)

	<u>EDUCATION:</u> COEFFICIENT (S.E.)	<u>PUBLIC</u> <u>SECTOR:</u> COEFFICIENT (S.E.)
Hours of work	-0.1146 (0.2431)	0.2476 (0.1658)
Skills	-0.5400 (0.2502)*	-0.6853 (0.1768)**
Incentive schemes	-1.1551 (0.3003)**	-0.9913 (0.1776)**
Performance affects pay settlement	-1.4440 (0.2442)**	-0.3818 (0.1878)*
Credentials	0.8065 (0.2338)**	0.3823 (0.2039)*
Job grade	0.3533 (0.2585)	0.3613 (0.1787)*
Years	0.4868 (0.2268)*	0.4847 (0.1850)**
Age	-0.8831 (0.2510)**	-0.4439 (0.2345)*

Huber-White standard errors in parentheses. All data are weighted. Also included in each row estimation are variables for years of education per worker; ln(employees); ln(employees) squared; % skilled manual workers; % part-time workers; % female workers; % workers over 50; % ethnic minority workers; and months tenure per worker. Default sector is private enterprise.

* significant at 5% level; ** significant at 1% level
 Number of workplaces = 1642.

Table 4
Target-setting, Market Pressures and Change in the Workplace
(probit)

	EDUCATION: COEFFICIENT (S.E.)	PUBLIC SECTOR: COEFFICIENT (S.E.)
Target: Costs	-1.0089 (0.2531)**	-0.8063 (0.1706)**
Target: Productivity	-0.2150 (0.2486)	-0.6664 (0.1764)**
Target: Quality	0.8743 (0.2248)**	0.0437 (0.1691)
Market competition: (very) high	-0.9434 (0.2363)**	-1.0245 (0.1820)**
A lot of change within last 5 years	0.2358 (0.2679)	0.0533 (0.2288)
Changes introduced (>3)	-0.0108 (0.2319)	0.1795 (0.1722)
Unable to introduce change	-0.1431 (0.2284)	0.1659 (0.1738)

Huber-White standard errors in parentheses. All data are weighted. Also included in each row estimation are variables for years of education per worker; ln(employees); ln(employees) squared; % skilled manual workers; % part-time workers; % female workers; % workers over 50; % ethnic minority workers; and months tenure per worker. Default sector is private enterprise.

* significant at 5% level; ** significant at 1% level

Number of workplaces = 1642.

Table 5
Unionization
(probit)

	EDUCATION: COEFFICIENT (S.E.)	PUBLIC SECTOR: COEFFICIENT (S.E.)
All workplaces:		
Prob (union enterprise)	2.0816 (0.1608)**	0.9660 (0.0990)**
Only union workplaces:†		
Managers negotiate/consult on pay	0.0955 (0.3215)	0.1826 (0.2283)
Managers negotiate/consult on personnel	0.3256 (0.3474)	0.6338 (0.2547)**
Managers negotiate/consult on appraisal	1.1449 (0.2960)**	0.6137 (0.2249)**

Huber-White standard errors in parentheses. All data are weighted. Also included in each row estimation are variables for years of education per worker; ln(employees); ln(employees) squared; % skilled manual workers; % part-time workers; % female workers; % workers over 50; % ethnic minority workers; and months tenure per worker. Default sector is private enterprise.

* significant at 5% level; ** significant at 1% level

Number of workplaces = 1642 † Number of workplaces = 954

Table 6
Log Pay per Hour
(OLS)

	MALE	FEMALE
Tenure	0.0012 (0.0002)**	0.0014 (0.0002)**
Tenure squared	0.0000 (0.0000)**	0.0000 (0.0000)**
Age	0.0482 (0.0020)**	0.0357 (0.0019)**
Age squared	-0.0005 (0.0000)**	-0.0004 (0.0000)**
Ethnic	-0.0580 (0.0155)**	0.0251 (0.0148)
Disability	-0.0376 (0.0130)**	-0.0536 (0.0145)**
Vocational training	-0.0379 (0.0066)**	-0.0104 (0.0069)
O-level/GCSE	0.0714 (0.0114)**	0.0903 (0.0109)**
A-level	0.1075 (0.0126)**	0.1516 (0.0122)**
Graduate	0.2280 (0.0132)**	0.2944 (0.0134)**
Higher degree	0.2792 (0.0169)**	0.3713 (0.0179)**
No qualifications	-0.0519 (0.0120)**	-0.0586 (0.0121)**
Widow	0.0220 (0.0394)	-0.0487 (0.0252)
Divorced/separated	0.0390 (0.0156)*	0.0268 (0.0137)
Married/cohabiting	0.0961 (0.0097)**	0.0183 (0.0093)*
Children	0.0318 (0.0076)**	-0.0326 (0.0075)**
Union member	0.0862 (0.0073)**	0.0768 (0.0072)**
Temporary worker	-0.0996 (0.0183)**	-0.0205 (0.0157)
Fixed contract	-0.0773 (0.0183)**	-0.0464 (0.0172)**
Works overtime	-0.0321 (0.0068)**	0.0053 (0.0064)

EDUCATION: PUBLIC	-0.1853	-0.1049
	(0.0152)**	(0.0119)**
EDUCATION: PRIVATE	-0.1936	-0.1486
	(0.0283)**	(0.0197)**
PUBLIC SECTOR	0.0076	-0.0381
	(0.0107)	(0.0098)**
FINANCE SECTOR	0.1486	0.0634
	(0.0165)**	(0.0141)**
TRANSPORT SECTOR	-0.0225	0.0414
	(0.0117)	(0.0194)*
HOTEL SECTOR	-0.2516	-0.2464
	(0.0189)**	(0.0162)**
WHOLESALE/RETAIL	-0.0586	-0.1330
	(0.0118)**	(0.0131)**
CONSTRUCTION SECTOR	-0.0083	0.0039
	(0.0123)	(0.0240)
UTILITIES SECTOR	0.1271	0.1325
	(0.0139)**	(0.0224)**
Constant	0.4404	0.6158
	(0.0373)**	(0.0363)**
Observations	13083	13407
Adjusted R-squared	0.5322	0.4915

8 occupational dummies also included.

All data weighted for sample selection.

Robust standard errors in parentheses.

* significant at 5% level; ** significant at 1% level

Table 7
Union Coefficients in Log Earnings Equations (OLS)

	<u>UNION</u> Coeff. (S.E.)	<i>n</i>
Male employees:		
EDUCATION	0.0558 (0.0336)	922
PUBLIC SECTOR	0.0784 (0.0216)**	2038
PRIVATE SECTOR	0.1525 (0.0147)**	10101
Female employees:		
EDUCATION	0.0628 (0.0209)**	2333
PUBLIC SECTOR	0.1448 (0.0163)**	3839
PRIVATE SECTOR	0.1181 (0.0200)**	7232

Other variables included in the above estimations: occupation dummies (8); tenure (squared); age (squared); ethnic group; disability; education qualifications (7); family status (4); fixed term work; contract work. All data weighted for sample selection. Robust standard errors in parentheses.

* significant at 5% level; ** significant at 1% level

Table 8
Education Sector Coefficients in Non-pecuniary Benefit Equations
(ordered probit)

Satisfaction with aspects of job	EDUCATION SECTOR Coeff. (S.E.)	<i>n</i>
Male employees:		
Respect from supervisors/line managers	0.1103 (0.0454)*	13182
Sense of achievement from work	0.1001 (0.0457)* †	13202
Amount of pay received	-0.3037 (0.0451)** †	13259
Influence over job	-0.0333 (0.0456)	13186
High stress (worry about work outside hours)	0.0397 (0.0448)** †	13314
Female employees:		
Respect from supervisors/managers	0.1287 (0.0359)** †	13257
Sense of achievement from work	0.1056 (0.0363)** †	13286
Amount of pay received	-0.1261 (0.0355)**	13316
Influence over job	-0.0814 (0.0362)*	13171
High stress (worry about work outside hours)	0.2125 (0.0352)** †	13390
Tendency to agree with statement:		
Male employees:		
I share the values of my organization	0.3038 (0.0465)** †	12910
Managers here are understanding about employees having to meet family responsibilities	0.3409 (0.0471)**	12549
People here are encouraged to develop their skills	0.2551 (0.0462)**	12782
I feel loyal to my organization	0.1519	12813

I am proud to tell people who I work for	(0.0464)** † 0.0561 (0.0458)	12789
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Female employees:

I share the values of my organization	0.3773 (0.0370)** †	12922
Managers are understanding about employees having to meet family responsibilities	0.3702 (0.0374)** †	12551
People here are encouraged to develop their skills	0.1935 (0.0367)**	12715
I feel loyal to my organization	0.2589 (0.0375)**	12793
I am proud to tell people who I work for	0.1229 (0.0368)** †	12747

Ten sectors are included; only the coefficient for the education sector is represented here. Other variables included in the above estimations: occupation dummies (8); tenure (squared); age (squared); ethnic group; disability; education qualifications (7); family status (4); fixed term work; contract work. All data weighted for sample selection. Robust standard errors in parentheses.

* significant at 5% level; ** significant at 1% level.

† denotes highest ranking sector.

Table 9
Quality of Service and Mean Workplace Earnings within Education Enterprises
(probit, OLS)

	(a lot) better than average quality	log mean wage of workplace
Performance-related pay	0.2755 (0.4996)	0.2212 (0.0669)**
Competitive market	-1.1680 (0.4534)**	-0.0959 (0.0341)**
Workplace unionized	-0.7411 (0.4224)*	0.1419 (0.0483)**
Manager qualified	-1.1957 (0.5438)*	0.0014 (0.0670)
Supervisors hire/fire	0.8620 (0.6144)	0.0327 (0.0652)
Cost targets	0.0839 (0.3189)	0.0055 (0.0350)
Ln(employees)	0.2748 (0.1701)	0.0251 (0.0221)
% professional workers	-0.5181 (0.7851)	0.3964 (0.1309)**
% part-time workers	-1.4771 (1.1519)	0.6126 (0.1073)**
% female workers	-0.0025 (1.2711)	-0.3982 (0.1618)*
Months tenure per worker	-0.0037 (0.0044)	0.0018 (0.0008)*
Education sector: private	1.2256 (0.4234)**	-0.0721 (0.0478)
Constant	-0.2993 (1.5669)	9.4227 (0.1944)**
R-squared		0.6109
Observations	<i>193</i>	<i>203</i>

Robust standard errors in parentheses

* significant at 5% level; ** significant at 1% level

References

- Ambler, J.S. (1994), 'Who benefits from educational choice? Some evidence from Europe', *Journal of Policy Analysis and Management*, 13, 454–476.
- Ashraf, J. (1992), 'Do unions affect faculty salaries?' *Economics of Education Review*, 11, 219–23.
- Ballou, D. (1995), 'Causes and consequences of teacher moonlighting', *Education Economics*, 3, 3–18.
- Ballou, D. (1996), 'Do public schools hire the best applicants?', *Quarterly Journal of Economics*, CXI, 97–133.
- Ballou, D. and M. Podgursky (1995), 'What makes a good principal? How teachers assess the performance of principals', *Economics of Education Review*, 14, 243–52.
- Ballou, D. and M. Podgursky (1997), *Teacher Pay and Teacher Quality*. W.E. Upjohn: Kalamazoo, Michigan.
- Bee, M. and P.J. Dolton (1995), 'The remuneration of school teachers: time series and cross-section evidence', *The Manchester School*, LXIII, 1–22.
- Belfield, C.R. (2000), *Economic Principles for Education: Theory and Evidence*. Edward Elgar: Cheltenham.
- Bishop, J. H. (1996), 'Incentives to study and the organization of secondary instruction', In Becker, W.E. and WJ Baumol (eds), *Assessing Educational Practices. The Contribution of Economics*. Russell Sage: London.
- Booth, A. and J. Frank (1999), 'Earnings, productivity, and profit-related pay', *Journal of Labor Economics*, 17, 447–463.
- Bradley, S. and J. Taylor (1998), 'Cost functions in secondary schools', University of Lancaster, mimeo.
- Brewer, D.J. (1993), 'Principals and student outcomes: evidence from U.S. high schools', *Economics of Education Review*, 12, 281–92.
- Brewer, D.J. (1996), 'Does more school district administration lower educational productivity? some evidence on the administrative blob in New York public schools', *Economics of Education Review*, 15, 111–24.
- Brown, B.W. (1992), 'Why governments run schools', *Economics of Education Review*, 11, 287–300.

- Bryk, A.S. and V.E. Lee (1992), 'Is politics the problem and markets the answer? An essay review of *Politics, Markets and America's Schools*' *Economics of Education Review*, 11, 439–451.
- Burgess, S. and P. Metcalf (1999), 'The use of incentive schemes in the public and private sectors: evidence from British establishments' University of Bristol, CMPO, mimeo 00/15.
- Chubb, J.E. and T. M. Moe (1988), 'Politics, markets and the organization of schools', *American Political Science Review*, 82, 1065–1087.
- Chubb, J.E. and T. M. Moe (1990), 'Should market forces control educational decision-making? A rejoinder', *American Political Science Review*, 84, 558–567.
- Coe, R. and Fitz-Gibbon, C.T. (1998), 'School effectiveness research: criticisms and recommendations', *Oxford Review of Education*, 24, 421–438.
- Dolton P.J. and M. Robson (1996), 'Trade union concentration and the determination of wages: the case of teachers in England and Wales', *British Journal of Industrial Relations*, 34, 539–555.
- Dolton, P.J. (1996), 'Modelling the labor market for teachers: some lessons for the UK', *Education Economics*, 4, 2, 187–205.
- Downes, T.A. and S.M. Greenstein (1996), 'Understanding the supply decisions of non-profits: modelling the location of private schools', *Rand Journal of Economics*, 27, 365–390.
- Duplantis, M.M., Chandler, T.D. and T.G. Geske (1995), 'The growth and impact of teachers unions in states without collective bargaining legislation', *Economics of Education Review*, 14, 167–78.
- Eberts, R.W. and J.A. Stone (1995), 'Economics of teacher unionization', In M. Carnoy (ed.) *International Encyclopaedia of the Economics of Education*. New York: Pergamon.
- Ehrenberg, R.G. and D.J. Brewer (1995), 'Did teachers' verbal ability and race matter in the 1960s? Coleman revisited', *Economics of Education Review*, 14, 1–21.
- Ehrenberg, R.G., Kasper, H. and D. Rees (1991) 'Faculty turnover at American colleges and universities: analyses of AAUP data', *Economics of Education Review*, 10, 99–110.
- Fidler, B, Earley, P, Ouston, J. and J. Davies (1998), 'Teacher gradings and OFSTED inspections: help or hindrance as a management tool', *School Leadership and Management*, 18, 257–270.
- Fitz-Gibbon, C.T. (1996), *Monitoring Education. Indicators, Quality and Effectiveness*. London: Cassell.

- Frey, D.E. (1992), 'Can privatization really improve achievement? A review essay' *Economics of Education Review*, 11, 427–439.
- Good, T.L. and J.S. Braden. 2000. *The Great School Debate: Choice, Vouchers and Charters*. Erlbaum Assoc.: New Jersey.
- Hanushek, E.A. (1998), 'Conclusions and controversies about the effectiveness of schools', *Federal Reserve Bank of New York Economic Policy Review*, 4, 1–22.
- Hoernack, S.A. (1994) 'Economics, organizations, and learning: research directions for the economics of education', *Economics of Education Review*, 13, 147–62.
- Hoxby, CM (1996), 'How teachers unions affect productivity', *Quarterly Journal of Economics*, CXI, 671–718.
- James, E. (1993), 'Why do different countries choose a different public–private mix of educational services?' *Journal of Human Resources*, 28, 571–592.
- Johnes, G. (1997), 'Costs and industrial structure in British Higher Education', *Economic Journal*, 107, 727–737.
- Johnes, G. (1999), 'The management of universities', *Scottish Journal of Political Economy*, 46, 505–522.
- Keep, E. (1993), 'The need for a revised management system for the teaching profession', *Education Economics*, 1, 53–59.
- Lankford, H. and J. Wyckoff. (1997), 'The changing structure of teacher compensation, 1970–94', *Economics of Education Review*, 16, 371–84.
- Levacic, R. (1998), 'Local management of schools in England: results after six years' *Journal of Education Policy*, 13, 331–350.
- Levacic, R. and J. Hardman (1999), 'The performance of grant–maintained schools in England: an experiment in autonomy', *Journal of Education Policy*, 14, 185–212.
- Lillydahl, J.H. and L.D. Singell (1993), 'Job satisfaction, salaries and unions: the determination of university faculty compensation', *Economics of Education Review*, 12, 234–43.
- Lopez-de-Silanes, F. (1997), 'Determinants of privatization prices', *Quarterly Journal of Economics*, CXII, 965–1025.
- Lott, J.R. (1987) 'Why is education publicly provided? A critical survey', *Cato Journal*, 7, 475–501.

- Meggison, W.L., Nash, R.C. and M. van Randenborgh (1994), 'The financial and operating performance of newly privatised firms: an international empirical analysis', *The Journal of Finance*, XLIX, 403–452.
- Milanowski, A. (2000), 'School-based performance awards and teacher motivation', *Journal of Education and Finance*, 25, 517–544.
- Prendergast, C. (1999), 'The provision of incentives in firms', *Journal of Economic Literature*, 32, 7–63.
- Pritchett, L. and D. Filmer (1999), 'What education production functions really show: a positive theory of education expenditures', *Economics of Education Review*, 18, 223–240.
- Shleifer, A. (1998), 'State versus private ownership', *Journal of Economic Perspectives*, 12, 133–150.
- Southwick, L. and I.S. Gill (1997), 'Unified salary schedule and student SAT scores: adverse effects of adverse selection in the market for secondary school teachers', *Economics of Education Review*, 16, 143–53.
- Sperling, J. (1998), 'The American for-profit university: a model for the information economy', *Economic Affairs*, 18, 11–16.
- Steinberg, R. and B.A. Weisbrod (1998), 'Pricing and rationing by nonprofit organizations with distributional objectives', In B.A. Weisbrod (ed.), *To Profit or Not to Profit: the Commercial Transformation of the Non-profit Sector*, Cambridge: Cambridge University Press.
- Tsang, M.C. (1988), 'Cost analysis for educational policymaking: a review of cost studies in education in developing countries', *Review of Educational Research*, 58, 181–230.
- Tweedie, J. (1990), 'Should market forces control educational decision-making? A response to Chubb and Moe', *American Political Science Review*, 84, 549–554.
- Vedder, R. and J. Hall (2000), 'Private school competition and public school teacher salaries', *Journal of Labor Research*, XXI, 161-168.
- Vining, A.R. and A.E. Boardman (1992), 'Ownership versus competition: efficiency in public enterprises', *Public Choice*, 73, 205–239.
- Walden, M.L. and C.M. Newmark (1995), 'Interstate variation in teacher salaries', *Economics of Education Review*, 14, 395–402.

APPENDIX 1: DEPENDENT AND CONTROL VARIABLE FREQUENCIES BY SECTOR

	PUBLIC EDUCATION SECTOR		PUBLIC SECTOR		PRIVATE SECTOR	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
PER WORKPLACE:						
Average years education	14.56	0.88	13.68	1.06	13.01	0.95
Ln(employees)	3.48	0.77	3.42	0.98	3.44	0.93
Ratio: skilled manual	0.03	0.08	0.05	0.15	0.15	0.24
Ratio: part-time workers	0.48	0.17	0.41	0.29	0.27	0.31
Ratio: female	0.82	0.13	0.74	0.27	0.44	0.29
Ratio: ethnic minority	0.03	0.01	0.06	0.01	0.04	0.10
Ratio: workers over 51	0.15	0.11	0.19	0.13	0.14	0.12
Average tenure (months)	84.34	31.00	72.79	31.62	66.81	38.97
Quality of product/service* (a lot) better than average	14.77	0.36				
Ln(average wage)*	9.87	0.25				
PER WORKER:						
% with a degree*	35.3		18.3		15.1	
Ln(wage)*	1.94	0.53	1.93	0.49	1.85	0.52

*Includes education workplaces or workers in the private sector.

APPENDIX 2: WORKPLACE VARIABLE DEFINITIONS AND FREQUENCIES (Mean, S.D.)

- ADM_BLOB The percentage of all employees who are either managers, administrative or clerical staff. (26.8)
- CANTCHAN =1 for management trying, but being unable to introduce change over the last 5 years with respect to either: payment systems, new technology, working time arrangements, organization of work, work techniques or procedures, initiatives to involve employees or new products or services. (10.6)
- COEFFVAR Ratio of standard deviation of average wage to the average wage. (38.8, 17.3)
- COMP4 =1 for competition in the market being assessed as (very) high. (58.5)
- COSTS_UP =1 for labor costs having gone up a lot relative to all other costs compared with 5 years ago. (24.3)
- FM_UNION =1 for one or more unions being recognized by management for negotiating pay and conditions for any sections of the workforce. (38.7)
- LABR_25 =1 for the proportion of the establishment's sales revenue/operating costs that is accounted for by labor costs being less than 25%. (27.5)
- MNG_QUAL =1 for managers having any formal qualifications in personnel management aside from experience. (21.5)
- MON_INDI =1 for individual employees monitoring quality. (50.8)
- MON_LOTS =1 for quality monitoring using at least two different methods of monitoring (e.g. individual, managerial or survey). (44.5)
- CHANGE2 =1 for management introducing change over the last 5 years (see CANTCHAN). (48.1)
- CHANGE1 =1 for management introducing more than 3 changes over the last 5 years (see CANTCHAN). (51.3)
- P_AGE =1 for age of employees being a factor that explains the differences between actual pay levels of full-time employees in the largest group. (18.3)
- P_CREDS =1 for formal qualifications being a factor that explains the differences between actual pay levels of full-time employees in the largest group. (25.8)
- P_GRADE =1 for job grade/classification being a factor that explains the differences between actual pay levels of full-time employees in the largest group. (59.6)
- P_HOURS=1 for hours worked being a factor that explains the differences between actual pay levels of full-time employees in the largest group. (52.6)
- P_INCEN =1 for incentive or PRP being a factor that explains the differences between actual pay levels of full-time employees in the largest group. (25.1)
- P_SKILLS =1 for skills/core competencies being a factor that explains the differences between actual pay levels of full-time employees in the largest group. (46.1)
- P_YEARS = 1 for years of service being a factor that explains the differences between actual pay levels of full-time employees in the largest group. (33.3)
- PERFPAY1 =1 for good organization or workplace performance being very important in having an upward effect on the pay settlement. (34.4)
- RELSGOOD =1 for the relationship between management and employees being rated as very good. (40.9)
- RTPRWKRS Proportion of professional workers out of total employees. (31.8)
- STRESS Proportion of firms where any employees have suffered from stress over the last 12 months. (23.7)

SUP_HIRE =1 for supervisors having the authority to make final decisions with respect to hiring staff to work under them. (19.7)

T_COSTS =1 for costs targets being set at the establishment. (57.6)

T_PRODTI =1 for productivity targets being set at the establishment. (34.4)

T_QUALITY =1 for quality targets being set at the establishment. (41.6)

TEAMWORK =1 for the proportion of employees in the largest occupational group working in formally designated teams being over 60%. (59.0)

TRAINING =1 if >60% of experienced employees in the largest occupational group have had formal off-the-job training in the last 12 months. (32.9)

UN_RULE1 =1 to indicate whether management normally negotiates or consults with union representatives on pay and systems of payment. (12.6)

UN_RULE2 =1 to indicate whether management normally negotiates or consults with union representatives on recruitment/selection of employees or manpower planning. (11.2)

UN_RULE3 =1 to indicate whether management normally negotiates or consults with union representatives on performance appraisals. (8.4)