CHAPTER FOUR

The Labour Market for Teachers

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4.1 Introduction

No book on the economics of education would be complete without an analysis of the teacher labour market. As discussed in the previous chapter, teachers are important in their impact on pupil attainment. The functioning and organization of the labour market for teachers is also important due to its potential effect on school effectiveness, children's human capital acquisition, and ultimately the growth of the national economy. This chapter analyses this important labour market, looking at policies and data from the UK (mainly England) to illustrate some more generalizable points about the supply and demand for teachers.

To some extent, the market for teachers functions like any other labour market, with schools acting as employers of teachers. However, the teacher market, like the market for some other public-sector occupations such as health professionals, is characterized by the state having both monopoly power in the provision of credentials (the state determines who is qualified to teach) and near monopsony power in the recruitment of teachers (since most teachers are employed in state schools). Furthermore, teaching is highly unionized and wages are generally determined by the government. Over the past 50 years, the UK has experienced recurrent crises in the recruitment and especially the retention of teachers. In 2002, for example, the DfES reported that annual turnover and wastage of teachers had reached 16.5% and 9%, respectively. Teacher shortages have been cyclical and regular in occurrence, and may be attributable to a number of factors, not least of which is the low wage of teachers relative to other occupations in the public sector. Furthermore, shortages may be acute in particular subjects, such as mathematics, science and modern foreign languages, or in specific geographical locations like inner London, where the "outside option" in terms of an alternative career is preferred.

The main questions of interest in this chapter are as follows.

(1) What policies most effectively address the problems of recruitment and retention of teachers?

(2) Since teaching is predominantly a female occupation, what are the implications of the feminization of the occupation for modelling teacher labour supply and for teacher incentives?
(3) What is the best way to reward teachers?
(4) How can one (acknowledging the constraint of a national pay scale) address shortages in specific subjects or geographical areas?
(5) What is the relative impact of non-pecuniary conditions on recruitment and retention?

4.2 Patterns of Change in the Teacher Labour Market

4.2.1 *Teacher Demand*

The first key element in the demand for teachers is the demographic pattern of pupil numbers. The total number of primary and secondary pupils in UK state schools from 1946 to 2000 has fluctuated considerably, from a low of around 3.5 million pupils in 1947 and 1985 to a high of nearly 5 million in the mid 1970s. These trends were carried over to secondary schools, causing a peak in the number of secondary-school pupils in 1979. Additionally, the beginning of the period shows a large increase in secondary-school attendance as the compulsory school-leaving age was raised from 14 to 15 in 1947 and further to 16 in 1973. Specifically, these reforms had the effect of increasing the number of secondary-school pupils from 1.1 million in 1946 to 3 million by 1972.

The second demographic trend affecting the demand for new teachers relates to the age distribution of the stock of existing teachers. Figure 4.1 reports the age distributions of primary and secondary teachers in 2000. Currently, the official retirement age is 65, but teachers can retire as early as 55. A substantial fall in the number of teachers is observed at the early retirement age of 55 and only a minimal number of teachers remain in the profession after the age of 60.

England is also characterized by having an ageing teaching population, especially in primary education. 40% of all teachers are aged 45–55, and those aged above 55 account for another 6% of the workforce. Within the next 10 years, nearly 50% of the current workforce would be expected to have retired. Since the number of pupils is not forecast to decrease significantly, at the current level of recruitment into teaching, a large shortage of teachers is therefore predicted. To some extent the government can influence the retirement plans of existing teachers, for example by reforming pension rights. For example, a change in the pension scheme in 1997 made it less financially advantageous for teachers to claim early retirement and led to a fourfold reduction in the proportion of teachers retiring before 60 (Eurydice 2002).

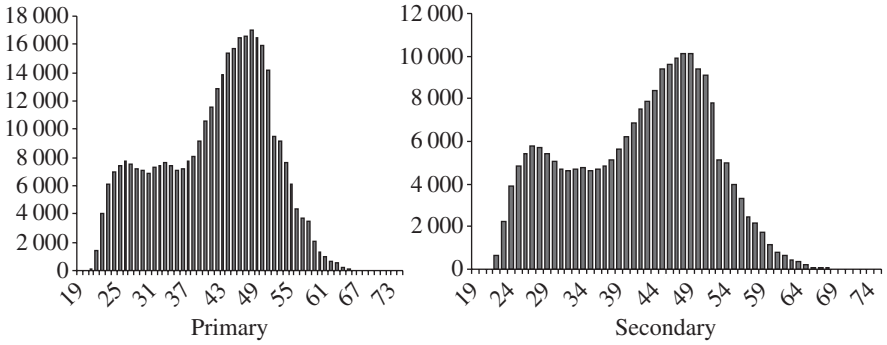

Figure 4.1. The age distribution of teachers in England (2000). (Source: Database of Teacher Records (England).)

Several additional features add further complications to the consideration of the demand for teachers. Firstly, the financial administration of education at a local level is performed by LEAs. This means that, although central government sets overall spending limits and determines teachers' salaries, it does not have day-to-day control over how many teachers a local authority may employ. Secondly, since the 1988 Education Reform Act, schools may be financially autonomous with devolved budgets. Hence it is at the level of the individual school where decisions about teacher recruitment are taken, based on the actual (or predicted) income derived from expected student numbers. Finally, it is the case that the determination of desired pupil–teacher ratios are influenced by educational criteria and salaries negotiated with trade unions. Therefore it is not surprising that the setting of salary scales, and attempts to meet target pupil–teacher ratios, could be incompatible with the constraints of government spending limits. In these circumstances a school's capital budget for buildings and equipment may have to be cut, to "balance the books". This also gives rise to relatively large variation in pupil–teacher ratios and per-pupil funding across different regions of the country and compounds difficulties associated with assessment of the aggregate demand for teachers.

4.2.2 *The Market for Teachers 1946–2000*

Given the complicating factors determining supply and demand, the calculation of the exact extent of the shortage (or surplus) of teachers can be problematic. For example, the government's own estimates of current shortages are sometimes based on the numbers of existing vacancies. These are often inconsistent with figures relating to the shortfall of demand over supply based on using desired pupil–teacher

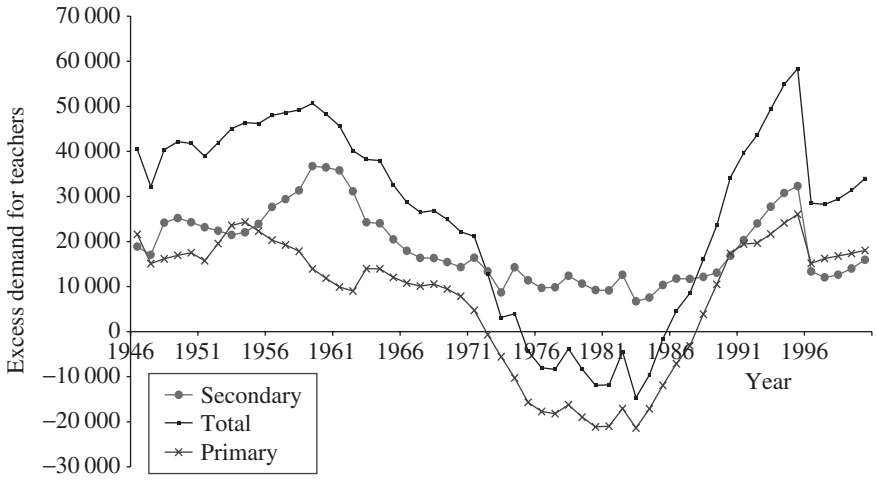

Figure 4.2. Excess demand for teachers: 1946–2001. The age distribution of teachers in England (2000). (Source: Database of Teacher Records.)

ratios and their own published pupil numbers.[1] In Figure 4.2 the demand for teachers is calculated by taking desired pupil–teacher targets, as published by the government, and multiplying them by actual pupil numbers. Teacher supply is taken from the government's own data on the number of teachers in service, and the excess demand – or teacher shortage – is the gap between demand and supply. Following this simple procedure suggests that in 2000 there was a national aggregate shortage of some 34 000 teachers.

Figure 4.2 shows that there has been an excess demand for teachers almost continuously throughout the post-war period. The main problem has been for secondary-school teachers, although the difference in excess demand between primary- and secondary-school teachers disappeared towards the end of the 1990s. The 1970s are the only time in the post-war period where a (small) excess supply of teachers was apparent. In some cases, the demand for teachers appears to change sharply from one year to the next. This is not due to demographic change, but to modification of the official desired pupil–teacher ratio. Since a shortage of teachers in the UK appears to be a permanent feature, the remaining discussion focuses on the determinants of the supply of teachers.

[1]For example, the official vacancy rate for teachers in the maintained sector was 1.3% in 2002, equating to a shortage of approximately 5000 teachers. Figures based on vacancies also hide the use of non-qualified teachers and thus understate the shortage of teachers.

4.2.3 *Teacher Supply: Quantity*

All teachers in the UK must be qualified. In England, a teaching qualification can be obtained after a four-year university degree in Education or after a one-year post-graduate qualification following a university degree in any subject. Newly qualified teachers must register with the General Teaching Council (GTC) as a pre-requirement to work in the maintained sector and gain Qualified Teacher Status. Ultimately, the government has some control over the stock of teachers (at least in the medium term) since it can determine how many places are provided on courses at universities to train teachers.[2]

There are many factors operating on the choice of whether to become a teacher or not. Teacher-training courses are not always filled, and attendance varies by subject. In the mid 1990s, there were 20% fewer students than targeted in Initial Teacher Training courses for secondary-school teachers, although this shortage has decreased to approximately 6% more recently. By subject the shortage is highest in mathematics, foreign languages and geography with shortfalls ranging between 20% and 30% in 2000/2001.

Measures to increase the retention of trainees and new teachers have been on the forefront of the political agenda on education. The most prominent measures are repayment of student loans for up to 10 years and a hardship allowance for students in shortage subjects committing to become teachers, bursaries for undertaking and completing the Postgraduate Certificate in Education (PGCE) and "Golden Hellos" of £4000 for new teachers in shortage subjects.

It is evident that the flow of newly qualified teachers does not necessarily indicate the level of overall supply. Focusing on those currently working as a teacher (Zabalza *et al*. 1979) ignores individuals who are available for (and possibly seeking) work in teaching, but who are not currently employed as a teacher. One can calculate supply as consisting of those entering the profession and those remaining in teaching from the previous year. For example, Dolton *et al*. (2003*b*) report that in 2000, 18 000 new entrants and 6000 re-entrants joined the teacher workforce. The difficulty, however, is not only recruiting teachers, but also keeping them in the classroom. Some trainees drop out and others decide not to become teachers. Smithers and Robinson (2003) showed that for 100 registered trainees, 88 passed the final examination, but only 59 were teaching a year later. After three years, only 53 of the original trainees were still in the classroom. This wastage adds to the costs of providing teacher training but also negatively affects child performance as inexperienced teachers are shown to be less effective in assisting pupils to achieve educational outcomes (Dolton and Newson 2003).

[2]For example, it is clear that part of the reason for the increase in the supply of teachers after 1963 was the rise in the number of places on training courses.

4.2.4 *Teacher Supply: Quality*

One of the most important, recurring debates in education is whether teacher quality is high enough. Whilst teacher quality is notoriously difficult to measure, the previous chapter assessed the work on the importance of teachers, concluding that some teachers do consistently perform better than others over time, showing that teacher effectiveness is an important determinant of pupil attainment.

However, even if it is unclear whether teachers with better personal academic records or qualifications are necessarily better teachers, one has to be concerned about recruiting teachers from the lower end of the ability distribution. There is some evidence in the UK (Chevalier *et al*. 2001; Nickell and Quintini 2002), as well as in the US (Corcoran *et al*. 2004; Lakdawalla 2001), that current teachers are being drawn from further down the educational achievement or ability distribution than they were in the past. This clearly matters for teacher recruitment and for pupil performance. The issue of how one might recruit better or smarter teachers, and provide them with appropriate incentives, is thus an important one. It is this we turn to next, beginning with a discussion of what has happened to teachers' relative wages through time.

4.3 Teacher Pay

The main element in the UK strategy to increase teacher recruitment and retention has been through offering financial incentives. Since teaching competes with all other professional occupations open to graduates, it is evident that governments therefore need to take into account changes in the graduate labour market when determining teacher wages. Thus it is not pay in teaching alone that matters but teachers' pay relative to potential "foregone" earnings associated with an alternative career.

Figure 4.3 shows the relative earnings of teachers compared with average non-manual earnings from 1955 to 2000. The decline in the relative earnings of teachers is evident from the figure.[3] Since 1992 teachers' pay has fallen by 6% relative to average non-manual earnings (although the decline "bottomed out" in the late 1990s). Examination of the longer-run pattern of change reveals that the pattern of teacher pay exhibits a cyclical repetitive pattern, namely a period of sustained

[3]Data on earnings are available from two sources, the October survey of earnings and, since 1968, the New Earnings Survey (NES). With respect to average earnings of all employees, the two surveys give similar estimates over the period in which they are both in existence, and so the reported average earnings is a simple average of the two estimates. For specifically non-manual earnings, the DfES's *Labour Market Trends* (formerly the *Employment Gazette*) reports an index based on the October survey until 1970, and from then onwards on the NES. However, the resulting estimate is considerably above the estimate of non-manual earnings supplied by the NES, thus, we only display teachers' earnings relative to the non-manual average from 1968 onwards using the NES.

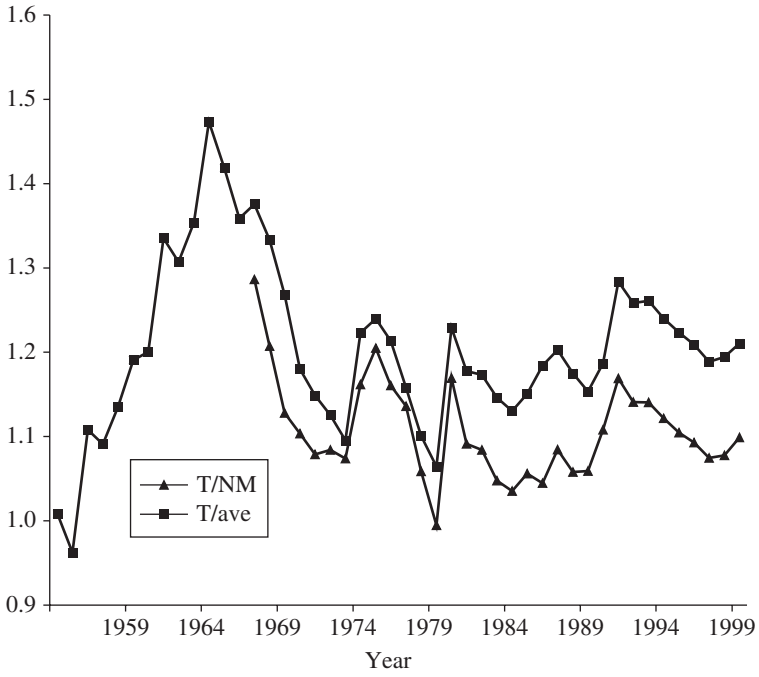

Figure 4.3. Teachers' relative wages 1955–2000.

decline, followed by a dramatic increase, usually as a result of a major government report which investigates the crisis in teacher supply.

Figure 4.3 clearly shows the process of "catch-up" following a decline in relative earnings, the most notable example being the average pay rise of 29% following the Houghton report in 1974. This was followed by 4–5 years of decline in real teacher pay before the Clegg Commission award of 1980 restored 1974 relativities. Comparing teachers' earnings to those of other public servants, teachers' pay has also declined by 11% relative to the earnings of policeman since 1981 and by 25% relative to nurses since 1973.

4.4 Who Becomes a Teacher?

A perspective on the decision to enter the teaching profession is provided by the analysis of cross-section, point-in-time data on individuals (recording career decisions, pay, educational achievements and other socio-demographic characteristics). These data permit an examination of the potential supply of teachers by the analysis of the individual decisions that "would-be" teachers make along with those graduates who choose an alternative career. In terms of a model of occupational choice

(Zarkin 1985) the expected utility of career alternatives is appraised before a job choice is made. A critical part of the choice concerns the way that expected earnings affect occupational choice.[4]

In this work, relative earnings in teaching compared with the non-teaching alternative have a marked effect on the occupational choice of graduates. In particular, the lower relative wages are (or wage growth is) in teaching, the less likely a graduate is to choose that career. Relative earnings impact both on initial career choices and on choices made later in an individual's career. Dolton (1990) also found that there is considerable inertia to remain in teaching, and suggested that this effect may be partially due to the different individuals' subjective evaluation of the relative pecuniary and non-pecuniary rewards to teaching. Chevalier *et al*. (2001) gave an overview of the market position for teachers in the UK from 1966 to the mid 1990s using graduate cohort data from five separate cohorts of university graduates: 1960, 1970, 1980, 1985 and 1990. The use of these data allowed these authors to simulate the effect of possible teacher pay rises over time. They find that relative wages in teaching compared with alternative professions have a significant impact on the likelihood of graduates choosing to teach, although the impact depends upon the market situation at the time. The wage effect on the supply of teachers is strongest at times of low relative teachers' wages, or following a period of decline in those wages. It is also strongest for those individuals who have more recently graduated. For example, increasing the wages of teachers by 10% would have led to an increase of nearly 10% in the supply of teachers in the mid 1980s but only 2% in the mid 1960s or early 1990s.

Labour-market conditions at the time the occupational choice is made are also important. Work by Court *et al*. (1995) based upon the Labour Force Survey found that aggregate labour-market conditions, particularly unemployment levels, are important determinants of teacher supply. The most recent evidence from Dolton *et al*. (2003*a*) reconfirms these findings with time-series data over the whole post-war period. Notably they find that the supply of graduates to teaching is counter-cyclical with most graduates' perception of teaching (and willingness to enter the profession) improving when graduate prospects are poor in alternative occupations and when graduate unemployment is high.

Whilst relative pay affects the decision to become a teacher, it also affects the decision to remain a teacher. Modelling the decision to leave teaching, Dolton and van der Klaauw (1995) show that the higher the relative earnings of teachers, the less likely they are to leave teaching. The importance of relative wages in teacher turnover decisions is examined by simulating a uniform 10% increase in relative

[4]Most commonly, researchers estimate a (reduced-form) earnings equation and then relate occupational choice to a predicted earnings level (i.e. where occupational choice and earnings are simultaneously determined (see, among many others, Dolton 1990; Manski 1987; Hanushek and Pace 1993)).

monthly earnings. This leads to a 9% reduction in the total exit probability at five years of tenure, or a total retention rate of 69%. A 25% increase raises the percentage of teachers still in teaching after five years to 73%.

Work based on US data suggests that raising teacher pay could improve the quality of the stock of teachers. Figlio (1997), accounting for school and district characteristics, concludes that districts offering higher starting salaries recruit teachers from more selective higher-education institutions. In particular, the author finds that a 1% increase in teachers' salaries increases the probability of recruiting a teacher from a selective higher-education institution by approximately 1.58 percentage points. Using information from the National Longitudinal Survey of Youth, Manski (1987) finds that a 10% increase in teacher earnings, coupled with a threshold on SAT scores, would maintain the current supply of graduates choosing to become teachers but they would originate from a higher part of the SAT distribution.

Attracting more-able students to teaching is not the only difficulty faced by policy makers. Since individuals with higher ability generally command higher wages in the labour market, high-ability teachers are at a higher risk of leaving the profession than less talented teachers (Stinebrickner 2001). To negate the lure of improved outside opportunities on "able"-teacher retention, fast-track programmes have been introduced in the UK with the aim of recruiting and retaining the most able graduates by shortening pay scales while providing them with additional training, support and supervision.

4.5 Feminization of Teacher Supply

Another important aspect of teacher supply is that teaching is a career that is relatively popular with female graduates. A crucial aspect of the distinction between male and female occupational choice is that often women are simultaneously making decisions about starting a family and hence deciding whether to participate in the labour market. This is particularly true in teaching since it is argued that a teaching career has complementarities with family formation, particularly in the ease with which one can return to teaching after a career interruption. Dolton and Makepeace (1993) find that the choice of teaching as a career is intimately related to the decision to participate in the labour market for women. This is true in the sense that unobserved factors, which make a woman more likely to select a career outside teaching, make them less likely to participate in the labour market and vice versa. This generates a positive correlation in the teaching occupational choice decision and the decision to work.

Feminization of the teaching profession does add some difficulties to the planning of the supply of teachers as many women will at some point interrupt their career for family reasons; 12% of primary teachers who resign do so for maternity or family-

care reasons (Smithers and Robinson 2003). Strinebrickner (2001) also estimates that, relative to men, women are more likely to exit teaching. Policies to facilitate work and child-rearing, such as subsidized childcare or reduced workload, therefore have scope for increasing teacher supply.[5]

Analysis of the role of non-pecuniary factors in the choice of occupation has been conducted by Dolton *et al*. (1989). They show that such factors are generally very important in the choice of teaching as an occupation, and in particular these factors seem to be more important for female than for male graduates.

4.6 Incentives and Teacher Rewards

While the evidence shows that raising pay impacts positively on the supply of teachers, it is not informative on how one can think about designing an optimal pay package to guarantee a supply of high-quality teachers (see a review on these issues by Lazear (2003)). Numerous authors advocate the lack of efficiency of across-the-board pay increases (see, for example, Odden and Kelley 1997). Raising the pay of existing teachers is inefficient since it is unlikely to radically improve their performance. In the UK, performance-related pay (PRP) is intended to boost teachers' earnings, whilst making the increase in pay dependent upon teachers demonstrating effective performance in their jobs.

The performance management arrangement in the UK PRP system has two main elements. Firstly, each teacher is appraised annually by his or her senior line manager, on the basis of previously agreed objectives. At the second performance review stage, the assessment is used by the head teacher as a basis for teacher pay decisions in the coming year.

However, PRP does not apply to all teachers but only to the most experienced who have reached "the threshold", which is at the top of the pay scales for classroom teachers (approximately six or seven years into their careers). The idea is that individuals who can prove themselves to be effective teachers, assessed against a set of nationally agreed criteria, will "cross the threshold", receiving an immediate £2000 pay rise, and access to a new higher pay scale for classroom teachers. Around 80% of teachers who were eligible for the threshold payment when PRP was introduced in 2000 applied for it, and around 97% actually received it.

It is unclear whether PRP is the appropriate vehicle to solve problems in recruitment and retention of teachers. For example, PRP may not be the best vehicle to improve teacher performance, since the outcome of interest, pupil achievements, is multi-dimensional and depends on the effort of a group of teachers rather than single individuals (Holmstrom and Milgrom 1991).

[5] A childcare allowance of up to £150 a week per child is offered to returnee teachers undertaking a training course for up to 12 weeks.

Of course, it is by and large an empirical question as to whether performance-related pay schemes actually improve teacher performance. Evaluation of PRP in the UK is not possible since the scheme was introduced nationally. Evidence from elsewhere in the world tends not to support performance-related pay schemes. With the exception of Lavy's (2002) evaluation of an Israeli school-based tournament, there is little international evidence that financial incentives for teachers improve students' outcomes. In fact, over time, most performance-related pay schemes for teachers have collapsed (Murnane and Cohen 1986) and there is evidence that the ability of PRP to motivate staff was limited (Marsden 2004).

4.7 Variations across Space and Subject

The fact that teachers' pay and conditions of service are determined for the whole market presents problems with the supply of teachers for particular subjects or in specific geographical areas. This is due to there being large specific market differences found within each subject and in each region of the country. This can lead to a position where there are shortages in some subjects, or in some areas.

As was discussed earlier, training places for teachers specializing in mathematics and languages are continuously surplus to actual take-up, despite there being a wealth of financial incentives to induce people to enrol. On the other hand, other subjects like physical education are always oversubscribed. Because outside options for teachers with high ability in mathematics or languages tend to be higher, they are also more likely to leave the profession (Lazear 2003). Smithers and Robinson (2003) confirm that teachers in mathematics, information and communication technology (ICT), languages and English were disproportionately more likely to resign. Furthermore, amongst all graduates, there is evidence that the average wage return to a mathematics degree is higher (39%) than for many other subjects (Walker and Zhu 2001). This means that the opportunity cost of teaching may be a lot higher for a mathematics graduate than for a history graduate in terms of the foregone earnings in alternative jobs.

As with other public-service professions, there have also been shortages of teachers in certain areas of the country, most markedly in inner London and the south east of England. Official vacancy rates are two to three times higher than the national average in London, despite London being the area relying the most on temporarily filled positions. Chevalier *et al*. (2001) estimate that a graduate with mean characteristics is 15 percentage points less likely to be a teacher if he or she lives in London. Teachers in London are also more likely to leave or transfer to other schools than teachers in other geographical area (Smithers and Robinson 2003). Official turnover and wastage rates in 2002 were, respectively, 20% and 11% in London compared with 15% and 9% for England. The recruiting difficulties in London are thought to

stem from the better wage opportunities in other jobs for potential teachers (and the upward pressure on living costs associated with a more competitive labour market in such areas). From April 2003, a specific salary scale has been defined for London replacing the previous London allowance. On the lower pay scale, teachers in London are paid about £3500 more than in the rest of the country; the pay differential for teachers on the PRP scale is up to £6000.

Budget permitting, schools in fact have the capability of adding some flexibility to teacher salaries. A range of recruitment and retention allowances, with a total value ranging from £1000 to £5400, can be offered to assist towards relocation, travel to work or provision of care for dependants. These allowances can be offered in case of recruitment difficulties. Thus, it will be possible for a school to offer this allowance to a new or established mathematics teacher but not to other teachers in the same school. However, it is possible that recruiting difficulties in London have more to do with the job conditions in inner-city schools than outside job opportunities and living costs.

4.8 Non-Pecuniary Conditions

It has long been asserted that many people become teachers due to the non-pecuniary benefits offered by joining the profession (long summer holidays being the classic, but not only, example). However, more recently, with the advent of the quasi-market and increased accountability, it has been argued that these non-pecuniary benefits have become less attractive. For example, it has been suggested that the extra burdens of the national curriculum and the rigours of the OFSTED inspection procedures (which involve increasingly detailed monitoring of pupil progress) have caused an excessive increase in the administrative burden on teachers. Moreover, it is commonly stated that increased workload and unruly pupil behaviour are important issues that are dissuading individuals from entering or remaining in the profession. There was such concern over this issue that the government commissioned an independent report into teacher working conditions (Coopers and Lybrand 1998). This report suggests that teachers are more overburdened with paperwork than they could or should be. Interviews of teachers leaving the profession also confirmed that heavy workload and school characteristics ranked more highly than salary as a reason for quitting (Smithers and Robinson 2003).

Other evidence from Chevalier *et al*. (2004) suggests that teachers are less satisfied in their jobs with respect to key attributes associated with the conditions of work than comparable graduates working in other fields. Teachers are particularly dissatisfied with pay and hours worked. Compared with other graduates, teachers are 12 percentage points more likely to claim to be dissatisfied with the number of hours worked. Compared with other employees, teachers' hours of work are concentrated

during term time with an average working week of 52 hours. For over 40% of the leavers surveyed by Smithers and Robinson (2003) nothing could have made them stay. For the others, change in workload or school characteristics were more likely to be cited than salary as an inducing factor to stay.

4.9 Conclusions

A perennial problem for any state-education system is how to ensure a steady supply of quality teachers. A key public-policy issue is how to provide enough reward to induce high-quality individuals to become teachers and stay in the profession. Despite an array of financial incentives, there has been an excess of teacher-training places, especially in subjects where the economic returns are high outside teaching.

A striking feature of the recruitment process in the UK is that half of those enrolled as teacher trainees are not in the classroom three years after gaining their teaching qualification and beginning work as a teacher. The wastage of teachers is observable at all career points but is especially high early on in the career. This is usually thought to stem from the relatively low pay of teachers, but non-pecuniary aspects also matter.

Over the years there have been various attempts at providing differential pay for teachers, but since 2000 this seems to have mainly been focused upon performance-related pay. While moves to introduce incentives into the wage structure of teachers seems, in principle, to be a good idea, there are many theoretical and practical reasons why it remains very unclear whether a performance-related system is effective for teaching. Finally, while most governments' policies to retain teachers have concentrated on financial incentives, surveys of teachers reveal that earnings are not the only determinants of their dissatisfaction. Heavy, and increasing, workloads and unruly pupil behaviour are commonly cited as reasons given to justify the decision to exit the occupation. If one wishes to get a high-quality teaching profession in place, all of these difficult issues need to be addressed.