ESTIMATING THE IMPACT OF A MINIMUM WAGE ON THE LABOUR MARKET BEHAVIOUR OF 16 AND 17 YEAR OLDS

A report prepared by

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Executive Summary

- As noted in the fourth report of the Low Pay Commission, there is evidence of very low pay for some 16 and 17 year olds and therefore a case, at least in principle, for introducing a minimum wage for this age group. However, a minimum wage may have adverse effects on their participation in further education and training and, therefore, may potentially conflict with other current policy objectives.

- This report presents quantitative evidence that can be used to inform the Commission's recommendations on whether to set a minimum wage for 16 and 17 year olds and, if so, the rate at which it should be set.

- Detailed analysis of the Youth Cohort Study data reveals a number of important and interesting findings:
    - The decision to remain in full-time education or to seek employment or a place on a Government supported training programme (such as Modern Apprenticeships) is typically made at the end of compulsory schooling.
    - This decision is largely permanent. Very few of those who leave full-time education at age 16 subsequently return to study, and most of those who remain in FTE at age 16 are still in education two years later, especially if an 'academic' programme of further education (i.e. AS and/or A-levels) is undertaken.
    - While differences by gender and family background are significant, the largest single influence on the decision to remain in full-time education at age 16 is GCSE attainment. Those who gain five or more GCSEs at grades A*-C by the end of their compulsory schooling (year 11) are considerably more likely to remain in full-time education - they are five times more likely to be in education than in a job and 20 times more likely to be in education than unemployed - as compared to those with no grades at this level.

- A formal model of the decision between education and employment at age 16 is developed and calibrated. Under a range of assumptions regarding the distribution of 'ability', the predicted impact of a minimum wage on education and employment participation is calculated. The most robust and reliable indicator of ability available is an individual's GCSE attainment. Using this as the measure of ability suggests that a minimum wage set between £2.50 and £4.00 will have negligible effects on education participation, irrespective of whether or not young people on Government supported training programmes are covered.

- In summary, the evidence presented in this report suggests that those seeking work and those remaining in education after the end of compulsory education form two rather distinct groups. Moreover, compared to other factors, wages would appear to have little influence on the allocation between these two groups. On this basis, a minimum wage for 16 and 17 year olds would be predicted to have only small effects on education participation, while affording a basic minimum level of protection for those in employment.

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ESTIMATING THE IMPACT OF A MINIMUM WAGE ON THE LABOUR MARKET BEHAVIOUR OF 16 AND 17 YEAR OLDS

1 Introduction

As noted in the fourth report of the Low Pay Commission (LPC4) (LPC, 2003), there is evidence of very low pay for some 16 and 17 year olds and therefore a case, at least in principle, for introducing a minimum wage for this age group. The proposed timescale suggested in LPC4 if a minimum wage is to be implemented for this group is for its introduction to be in October 2004. However, whether the Commission should recommend a minimum wage rate - and, if so, the rate that it should recommend - depends crucially on the likely impact that a minimum wage would have on the education, training and employment decisions and activities of 16 and 17 year olds. It is clearly extremely important to attempt to ascertain the influences on the labour market decisions of young people in order to avoid unintended adverse effects on education, training and/or employment resulting from labour market interventions of this kind. This report provides some quantitative information that can be used to inform the Commission's recommendations. Coupled with the available relevant qualitative information, this will help provide the evidence base on which to make the decisions regarding whether to recommend a minimum wage for 16 and 17 year olds and, if so, at what level the minimum wage should be set.

Consideration for introducing a minimum wage for 16 and 17 year olds can be based in part on the finding that the introduction and uprating of the minimum wage for 18 to 21 year olds at the youth Development Rate would appear to have had little, if any, adverse impact on the employment probabilities for those in employment (Stewart, 2002a; 2003). Nor would it appear to have significantly adversely affected the continued growth in participation in further and higher education by this age group. To the extent that 16 and 17 year olds have similarly low levels of labour market experience and workplace skills, and are employed in similar sectors, valuable information regarding the likely impact on 16 and 17 year olds may be obtained from examining the labour market experiences of 18 to 21 year olds since the introduction and subsequent upratings of the youth development rate since April 1999. Therefore, by way of background, the first substantive section of this report describes the recent

trends in participation by young people in these two age groups, using data from successive Labour Force Surveys (LFS).

However, there are some important caveats to using the experiences of those aged 18 to 21 as a basis for the likely impact on 16 and 17 year olds and these are also discussed briefly in Section 2. One difficulty in assessing the likely impact of introducing a minimum wage for 16 and 17 year olds is that their further education (FE), training and employment decisions following the completion of compulsory schooling are inextricably linked. They are also, at least in part, inter-temporally determined with their (anticipated) future decisions regarding participation in higher education (HE). Moreover, as shown in detail below, many students aged 16 and 17 simultaneously work part-time while they study, and thus the decision to work (or to try to find employment) and the decision to remain in education are not necessarily mutually exclusive outcomes. However, it seems appropriate and sensible to distinguish between an individual's *main* activity as being in full-time education (FTE), either at school or FE college, or as being in (part-time or full-time) employment (or seeking work), and to treat these as separate labour market states. The impact of introducing a minimum wage for 16 and 17 year olds is likely to be different for those in FTE and those in employment and is also likely to affect individuals' decisions in choosing between continuing in education or entering the labour market at age 16.

The Youth Cohort Study (YCS) surveys allow these distinctions between education and employment to be investigated in detail, and also have a number of other important advantages as a source of information on the choices that young people make between different, potentially competing, activities. Hence Section 3 reports detailed findings from the three most recent YCS datasets, with an emphasis on examining the importance of decisions made at the end of compulsory schooling in year 11 (at age 16) for subsequent labour market activity. These decisions and their consequences are summarised in the form of transition matrices which document the outcomes at age 18, two years after leaving compulsory education, in relation to the decisions made at age 16. The longitudinal nature of the YCS facilitates an examination of these transitions and how they may be changing over time. Differences - according to gender, educational attainment at the end of compulsory schooling and parental socio-economic and educational background - in the

transitions between individuals are also examined. The major finding from this section is that decisions made at age 16 are largely *permanent* in that very few young people return to FTE once they have entered the labour market, and the majority who stay in FTE beyond year 11 are also still in FTE at age 18.[1] This persistence in education as an activity is especially strong for those who select to take further 'academic' qualifications such as A-levels and AS-levels from age 16, as opposed to those who select a more vocational qualification route for their FE. However, there are important differences between individuals according to their educational attainment at the end of compulsory schooling and the educational and socio-economic background of their parents, and these and other factors need to be taken into account when assessing any impact that a minimum wage for 16 and 17 year olds may have.

Section 4 provides an empirical model of individuals' decisions at age 16 using the YCS data. A simple economic model suggests that individuals will choose to remain in FTE at 16 if the discounted expected benefits from so doing outweigh the expected benefits from entering the labour market. The benefits are 'expected' in the sense that they depend on the probability of success in further/higher education, and on the probability of employment and the expected wage if entering work. Econometrically, multinomial models are presented which investigate the determinants of individuals' different outcomes at age 16, conditional on their individual and family characteristics. The outcomes considered include FTE, employment, government supported training (GST) and unemployment. The most pertinent decision in the current context is whether or not to remain in FTE at age 16. The multinomial model allows the importance of determinants such as gender, prior qualifications and family background to be investigated and their relative significance assessed.

[1] In fact, there is evidence to suggest that the relationship between activities at age 16 and at age 19 are even more highly correlated than between those at age 16 and at age 18. This is essentially because of the practice of taking a 'gap-year' at age 18 before returning to FTE - usually into HE - at age 19. However, data are not generally available from the YCS for those aged 19, and hence the analysis in this report is confined to examining transitions in labour market states between age 16 and age 18 for which consistent YCS data are available over time.

Earnings – or, rather, potential earnings - are also likely to be a factor in the decision process at age 16. One difficulty with the framework utilised in Section 4 is that earnings are likely to be simultaneously determined with employment (and hours). While an attempt to circumvent this problem is made in the empirical analysis presented in Section 4, the approach used does potentially have a number of weaknesses. Thus, Section 5 develops a rather different approach based on a structural/theoretical model of the decision making process. The model captures the main features of the outcomes at age 16, with a focus on individuals' expectations regarding success in further (and perhaps also higher) education, and their (potential) earnings in employment.[2] This theoretical model is then calibrated using data taken from the YCS, and a number of different simulations are presented for differing assumptions regarding the success rates of students in FE and, in particular, for different values of a minimum wage for 16 and 17 year olds. Under the most plausible assumptions regarding the distribution of ability amongst 16 and 17 year olds, the predictions from this analysis suggest that changes in participation in FTE are likely to be small (less than 0.5%) for any reasonable rate (between £2.00 and £4.00 per hour) selected for the minimum wage. This conclusion holds *a fortiori* if those on GST programmes are excluded from the minimum wage coverage given that this group is disproportionately represented amongst those receiving low pay.

Any assessment of the likely impact of a minimum wage for 16 and 17 year olds on their education and employment participation decisions is complicated by the envisaged timetable. A minimum wage implemented in October 2004 will follow immediately after the national roll-out of Educational Maintenance Allowances (EMA) scheduled for September 2004. These will provide a means-tested subsidy (based on parental income) to remaining in FTE. The findings from the EMA pilot studies

[2] However, the impact of a minimum wage for 16 and 17 year olds on different labour market outcomes (i.e. job or GST), or on the number of hours worked, are not explicitly modelled in this framework. The former would require a more sophisticated model which captures the apparent hierarchical nature of the choice between different labour market outcomes. The latter would need to take account of the fact that many of those in FTE also work part-time with the implication that any standard labour supply framework in which hours of work are zero for labour market 'non-participants' would not be applicable (see Section 2 for details). These two additional dimensions of labour market behaviour of 16 and 17 year olds are therefore not captured by the model which focuses mainly on the education vs labour market participation decision.

(Ashworth *et al*, 2002) suggest that this intervention will increase post-16 FTE participation nationally by about 3%. This is a very large impact as may be expected from the scale of the transfer – anticipated to be up to £30 per week and which therefore represents a substantial number of hours of paid employment for this age group. The financial incentive to remain in education derived from EMA may therefore be rather greater than any disincentive effect on education participation from increasing wages resulting from the introduction of a minimum wage. In part, this is because the introduction of a minimum wage would probably tend to compress the bottom of the earnings distribution for young people rather than significantly increasing its mean. In any event, the near simultaneity of these two major interventions in the youth labour market will make it extremely difficult to identify and subsequently to assess the separate impact of each.[3]

In summary, the following four sections of the report present:

(i) aggregate trends in economic activity amongst young people using the LFS;

(ii) detailed longitudinal evidence on education and employment activities - and on the transitions between these different activities - at age 16 and age 18 using the YCS;

(iii) an empirical model of the determinants of different activities at age 16 using the YCS, including the importance of (potential) earnings; and

(iv) simulations of a theoretical model of education and employment decisions at age 16, including the impact on these decisions of different levels of a minimum wage for 16 and 17 year olds.

The final section of the report presents some concluding thoughts and comments.

[3] There is also the proposed top-up University fees contribution – currently forecast to be a maximum of £3,000 *per annum* – due to be introduced in 2006 (DfES, 2003a). This will further complicate any assessment of the impact of a minimum wage on education and employment decisions – since the *anticipation* of this increase in fees will affect the decisions that 16 and 17 year olds make in 2004.

2 Recent trends in economic activity amongst young people

The principle aim of this study is to investigate the link between wages and the decision to undertake work, training or further study for the 16 and 17 year old age group. Some recent research on the influences on these decisions has already been undertaken. For example, the importance of parental background and innate ability is well-documented (see, for example, Chevalier and Lanot, 2001 and Conlon, 2002 and the references cited therein). However, there is little evidence for recent cohorts of young people in the UK, and hence there is considerable scope for some new research which investigates the determinants of the various outcomes for 16 and 17 year olds in order to inform the LPC's decision regarding the likely impact of a minimum wage for this group.

Standard labour supply theory suggests that an increase in the wage rate (following the introduction of a minimum wage, for example) can lead to effects on both labour market participation and hours of work decisions. If education and working are alternative/competing uses of an individuals' time, and education is a so-called 'normal' good (such that those with higher income undertake (or 'purchase') more education), then the impact of raising the wage for 16 and 17 year olds in employment may increase or decrease working hours, and thus decrease or increase hours in education. That is, the impact of a minimum wage (which increases the wage) on employment and education is ambiguous. It depends on whether the desire/incentive to work more hours - given that the opportunity cost from not working is greater - outweighs the need to work fewer hours for the same or more income than before the minimum wage raised the wage rate. In principle, within such a framework, estimated labour supply elasticities for young people could be used together with simulated changes in the wage resulting from the minimum wage to gauge the overall impact on hours worked and participation in education.[4] Within this theoretical framework, for those not currently working (i.e. they are either unemployed or economically inactive - whether or not in education), the introduction

[4] However, there would appear to have been no empirical estimates of labour supply elasticities for just 16 and 17 year olds.

of a minimum wage would increase the incentive to work, and therefore unambiguously lower their probability of engaging in education. [5]

However, this standard microeconomic theory is incomplete because it is evident that education and work are not necessarily alternative/competing activities – many students both work and study simultaneously. Table 2.1 demonstrates this fact using data taken from the LFS Spring 2003. Panel A shows the proportions in each of three possible labour market states - employment, unemployment and economic inactivity - broken down by whether or not in FTE, and by age group.[6] The first column reveals that for those aged 16 and 17, 57% of all those not in FTE are in employment, 21% are classified as unemployed, and 22% are economically inactive. For those in this age group in FTE, just over 36% are in employment. This is a substantial proportion of all those in this age group in FTE, and also of all in this age group. Panel B presents the shares in each activity group. Over 65% of those in employment are in FTE. Therefore, in total, 27.0% of all those aged 16 and 17 are in FTE and also, simultaneously, in (predominantly part-time) employment as shown in Panel C. In contrast, only 14.3% of all those aged 16 and 17 are in employment but not in FTE. The corresponding figures for 18 to 21 year olds are 17.0% and 42.7% respectively. Clearly, working and studying simultaneously amongst young people is not uncommon so that education and employment are complementary rather than alternative/competing uses of time for a significant proportion of young people. Thus, any naïve labour supply analysis which fails to allow for these joint outcomes will be deficient.

One solution to this problem would be to construct a general equilibrium model of the different decisions facing 16 and 17 year olds and then use it to simulate the proposed introduction of a minimum wage. A recent attempt to model the simultaneous relationship between education, wages and working behaviour can be

[5] While in theory the introduction of a minimum wage may increase the incentive to work (and thus lower the probability of engaging in education) for those not currently working (i.e. unemployed or inactive) and also not in FTE, in practice such individuals may face a number of problems which prevent them making unconstrained choices and decisions.

[6] The definition of economic activity is based on the formal (ILO) definition of unemployment and economic (in)activity (variable *INECACA* in the LFS).

found in Bingley *et al* (2003). They estimate the education, wage determination and labour supply/participation decisions using data from the Family Resources Surveys (FRS), and then use their results to simulate the impact of the forthcoming introduction of EMA on education, wages and labour supply decisions over the lifecycle. However, in their model, individuals have already completed their full-time education (all individuals are married or partnered, aged 25 years or above), while the focus in this report is on the *simultaneous* and *instantaneous* impact of the minimum wage on education and work decisions for current cohorts of 16 and 17 year olds. Thus, the results in Bingley *et al* (2003) cannot be used to estimate/simulate the impact of implementing a minimum wage for 16 and 17 year olds.

Aggregate data can be used to yield information on the broad trends and patterns in economic activity for young people. Figure 2.1 presents the composition of economic activity for the last three years, disaggregated by age and education using comparable (Spring) LFS surveys. The recent increase in economic inactivity amongst those aged 16 and 17 noted in LPC4 is evident from the left hand side of the graph. In particular, more than 40% of 16 and 17 year olds not in FTE are either unemployed or economically inactive. In contrast, there has been no corresponding significant increase in inactivity for those aged 18 to 21 in the same period.

Further details on individuals' reasons for inactivity can be obtained from the YCS. In YCS Cohort 11, sweep 1 (for the cohort that finished compulsory schooling in 2001), respondents who are not in employment nor doing any education or training are asked the reasons for their inactivity[7] by selecting all those from a list of 13 possible reasons which apply. Just over 14% of the sample declared that they were not currently in employment or doing any education or training, but not all then chose one or more of the reasons listed for their inactivity (about one quarter did not respond despite being inactive). Figure 2.2 illustrates their responses expressed as a percentage of all those who declared they were inactive. Of those choosing reasons for their inactivity, the median number of reasons chosen is 2 (the mean is 2.5). As can be seen, the most commonly cited reasons are that they think they "need more

[7] Note that this is not the same (ILO) definition of 'inactivity' as used in the LFS since it explicitly excludes those who are in education.

qualifications and skills to get a job or education or training place" (38% cited this reason), and/or they "have not yet decided what sort of job or course to do" (32%) and/or they "have not found a suitable job or course" (36%). The other reasons are seldom chosen by any respondents.

The longer-term trends in economic activity by age group are shown in Figure 2.3. Both age groups experienced some increase in their share in employment in the mid-1990s, but this trend appears to have levelled off to around 40% for those aged 16 and 17 and 60% for those aged 18 to 21. Figure 2.3 also reveals that the recent increase in economic inactivity for the younger group represents a return to the levels of inactivity seen in the mid-1990s, rather than being evidence of a continuing trended increase in economic inactivity.

Figure 2.4 provides a finer disaggregation of economic activity and inactivity. As can be clearly seen, most of the recent growth in economic inactivity for those aged 16 and 17 is amongst students who are inactive (i.e. students neither working nor seeking work), rather than amongst those who are not students, and is therefore perhaps of less concern than first appears. Figure 2.5 presents a similar disaggregated picture for 18 to 21 year olds. For this age group, improved employment prospects and a consequent fall in unemployment can clearly explain most of the aggregate trends revealed in Figure 2.3. This disaggregation serves to illustrate the difficulties in interpreting aggregate trends which can hide compositional changes that may be of considerable interest and importance.

That young people are poorly paid is partly a consequence of their comparative low experience and education and skills levels, but also a consequence of the work that they do. Figure 2.6 and Figure 2.7 illustrate the trends in the industrial composition of employment for those aged 16 and 17 and those aged 18 to 21 respectively.[8] The trends mirror the general decline in manufacturing and the move towards increasingly service-orientated employment. It is evident that young people are over-represented in the wholesale/retail sector and the hotels and restaurant sector, and the concentration of employment in these two industries is particularly high for those

[8] Industrial sector is presented at the 1-digit level, with some smaller categories grouped together.

aged 16 and 17 as can be seen when comparing Figure 2.6 and Figure 2.7. These industries are two of the very lowest paid sectors in Britain, even having controlled for the characteristics of their employees (see, for example, Carruth *et al*, 2002). A minimum wage for 16 and 17 year olds would have its greatest 'bite' in these industries given their low rates of pay, and thus may have greater (negative) employment consequences given the relative importance of these two sectors in their employment.[9]

It is evident from the data presented in this section that the introduction and uprating of the minimum wage for 18 to 21 year olds since April 1999 has had little apparent impact on economic activity, employment rates or the industrial composition of their employment, and this has been confirmed more formally in Stewart (2003). Given the similarities between the two age groups, then these findings provide some initial evidence that a minimum wage for those aged 16 and 17 may have a similarly negligible impact.

While this argument undoubtedly has some merit, one final consideration concerns the extent to which valid inferences can be made for 16 and 17 year olds from comparisons with the education and labour market behaviour of those aged 18 to 21. Remaining in education at age 16 to participate in FE is typically part of an inter-temporal, and longer-term, strategy which includes HE from age 18. For example, approximately 90% of students who obtain two or more A-levels now subsequently go on to university (DfES, 2003b). Similarly, evidence from the Youth Cohort Study (YCS) (DfES, 2001) reveals that activity at age 19 is highly correlated with activity at age 16: 58% of those in FTE at 16 are also in full-time education at 19, while 62% of those in a job at 16 are also in a job at 19.[10] Moreover, 75% of young people with five or more GCSE grades A*-C at year 11 and who are in FTE at age 16 are also in FTE at age 19, as compared to only 29% for those in FTE at age 16 but with fewer

[9] However, the evidence from the US for the fast-food industry sector perhaps paints a somewhat brighter picture – the uprating of the minimum wage there did not have the anticipated negative employment consequences (see Card and Krueger, 1995, *inter alios*).
[10] This evidence is derived from YCS Cohort 9, sweep 4.

GCSEs.[11] Such persistence in education highlights the importance of ensuring that individuals are not discouraged from remaining in education at age 16 by higher wages as a result of introducing a minimum wage if the government's target to increase participation in HE towards 50% of those aged 18 to 30 by 2010 is to be achieved. It also makes aggregate comparisons with 18 to 21 year olds less pertinent.

[11] This is even larger than differences than at age 18 when the figures are 67% and 42% respectively as shown in Section 3. This increase between age 18 and 19 reflects the common practice of taking a 'gap-year' before entry into HE, and hence these individuals are 'doing something else' at age 18 but have returned to FTE at age 19.

3 Longitudinal evidence on education and employment rates for young people

There are a number of potential data sources which can be used to inform our understanding of the linkages between wages and the various activities that young people undertake. The choices are essentially between large scale administrative record databases – in particular, the New Earnings Survey (NES) – and smaller scale sample surveys such as the LFS, YCS, FRS, the EMA Pilot surveys and the British Household Panel Survey (BHPS).

For young people, who are typically low paid and/or work less than full-time, the NES will be a poor data source since it explicitly excludes most of those whose earnings are less than the pay-as-you-earn (PAYE) National Insurance Contribution (NIC) threshold. This criterion will result in the exclusion of most young people since they are either not working (and thus have no earnings) or tend to earn less than the threshold. In addition, the NES contains little or no information on individual or family characteristics and these are known to be important influences on the decision to continue in FTE.

The various sample surveys have different strengths and weaknesses. LFS is comparatively large, but has a limited longitudinal element - as compared to the continuous repeated panel sample of BHPS - due to its rotating panel design (any individual is only observed for a maximum of five quarters). However, despite its longer panel element, and considerable detail, the BHPS is small, particularly when restricted to the age groups of interest.[12] Similarly, while the FRS is extremely informative about labour supply decisions, it has only a limited pool of young people. Other longitudinal surveys such as the NCDS and the BCS are now rather dated, in that they record information for a group of individuals who were born in 1958 and 1970 respectively. Expectations and decision-making regarding continuing in FE or entering employment were rather different in the mid-1970s (for the NCDS) and the late-1980s (for the BCS) than they are today, and thus these surveys are unlikely to provide very meaningful information for the current cohorts of young people.

[12] Stewart (2002a) provides a much more comprehensive assessment of the relative merits and demerits of the NES, LFS and BHPS datasets for longitudinal analysis for those aged 18 and over.

It would therefore appear that the best source of reliable information on education, work experience and training for young people in England and Wales is provided by the YCS surveys.[13] These cohort surveys commenced in 1985, and are ongoing. Each cohort is surveyed by a postal questionnaire on a number of occasions ('sweeps'), with the first sweep in the Spring in the year after completing compulsory education when individuals are (mostly) aged 16. Individuals are then re-interviewed on an annual or biennial cycle, with most cohorts interviewed three times in total.[14] Education attainment, training, hours of work, earnings and broad socio-demographic information are all recorded, and thus these data would seem ideally suited to investigating the key questions of interest in this report.

The remainder of this section therefore documents the education, training and labour market activities of young people using data from three successive YCS surveys – namely Cohort 8, Cohort 9 and Cohort 10. The main focus is on the education and labour market decisions that young people make at age 16 and the relationship between these decisions and their education and labour market activities at age 18.[15] In order to investigate this relationship, individuals' different activities are summarised in transition matrices. These document the cross-sectional activity rates and the longitudinal changes (transitions) between various 'states' or activities (employment, education etc) between age 16 and age 18.

[13] It should be noted that the different countries of the UK have rather different education systems and traditions of participation in FE and HE, especially in Scotland where the 50% higher education participation target has already been achieved on the back of a rather different secondary education system than exists in the rest of the UK. While the LFS covers the whole of the UK, the YCS surveys cover only England and Wales.

[14] The exceptions are Cohort 9 (mostly aged 16 at January 1998) which had a fourth sweep in Autumn 2000, and Cohort 10 (mostly aged 16 at January 2000), which was surveyed twice (Spring and Autumn) in 2000. See Appendix A for further details.

[15] Strictly speaking, their activities are recorded at age 16 or 17, and again at age 18 or 19 since the YCS surveys considered in this report all took place in the Spring of each year. The important feature of the YCS surveys considered in this report is that the first sweep (or wave) for each cohort takes place in the Spring following completion of year 11 (i.e. in the Spring following the end of compulsory schooling), and there is another sweep exactly two years later.

3.1 Aggregate transition matrices

A transition matrix presents the movements between different labour market activities or states at time *t* and time $t+1$ as summarised in the transition rates or probabilities. Let p_{ij} be the probability that an individual in state *i* at time *t* moves into state *j* ($i, j = 1,...,J$) by time $t+1$. The matrix, $P = \{p_{ij}\}$, of these probabilities such that $\sum_j p_{ij} = 1$ for each *i* is the transition matrix. In the simple two-period case considered in this report, these probabilities are simply the relative frequencies of each state at time $t+1$.

Initially, five broad activities are defined using the responses to the YCS question which asks individuals to record their 'main activity at the moment'. These five activities are:

FTE: Full-time education at school, college, FE or HE institution

GST: Government supported training, such as Modern Apprenticeship

Job: Full-time or part-time employment (if this is their *main* activity)

U/E: Out of work, unemployed, or looking for employment

Other: Including: at home looking after the home or family, taking a break from work or study (such as a gap year)

Transitions between these broad labour market activities at age 16 and age 18 are presented in Table 3.1 separately for YCS Cohort 8, Cohort 9 and Cohort 10 and, finally, for these three cohorts combined. The probabilities are given in percentage terms. The different labour market states at age 16 (i.e. at time *t*) are reported in the rows of the transition matrix, while the labour market states at age 18 (i.e. at time $t+1$) are given in the columns. Each transition matrix also reports the relative frequencies at age 16 (in the penultimate column) and at age 18 (in the final row), as well as the (weighted) sample sizes in the final column.

To illustrate, the interpretation of the information in the transition matrix for Cohort 8 is as follows. Of those in FTE at age 16 (i.e. in the Spring of the year following the end of their compulsory education), 56% were in FTE at age 18, two years later, while 6% were in GST, 30% were working either full-time or part-time and 4% were

unemployed. The penultimate column indicates that, in total, 70% of the population at age 16 were in FTE, 10% were in GST, 11% were employed either full-time or part-time, and just under 5% were unemployed.[16] Similarly, the final row of the transition matrix for Cohort 8 reveals that 42% were in FTE at age 18, 9% in GST, 37% in employment and 7% were unemployed.

Comparing the different cohorts reveals quite a high degree of stability for the main activities across the period under investigation. There is considerable persistence in certain states/activities between the two sweeps for each YCS cohort. For example, 70% of those in employment at age 16 are still in employment at age 18. Similarly, more than half of those in FTE at age 16 remain in FTE at age 18.

In order to compare and contrast the degree of persistence exhibited by the different cohorts, a summary measure of the mobility between states can be computed. One commonly used index of mobility, as suggested by Shorrocks (1978), is defined as:

$$S(P) = \frac{J - trace(P)}{J - 1} = \frac{J - \sum_{j=1}^{J} p_{jj}}{J - 1}. \qquad (3.1)$$

If the probability of being in state *i* at time *t* is the same as being in state *i* at time $t+1$, then $p_{ij} = 1$ for all $i = j$, and 0 otherwise. In this case, $trace(P) = J$, and $S(P) = 0$. Similarly, if the probability of being in state *i* at time *t* is independent of being in state *j* at time $t+1$, then $p_{ij} = \frac{1}{J}$ for all *i* and *j*, and $trace(P) = 1$, so that $S(P) = 1$. These two extremes of complete immobility and perfect mobility provide the lower and upper bounds on $S(P)$. Shorrocks also demonstrates that this index also has a number of other desirable properties such as monotonicity (i.e. higher values of $S(P)$ correspond to greater mobility). Its value can be interpreted as the average probability that an individual will leave their initial state by time $t+1$.[17]

[16] The 'Other' category at age 16 typically comprises only around 2% or 3% of the population (and even less of the sample observations), and hence all the statistics regarding this category should be regarded with considerable caution – see Appendix A for further details.

[17] One obvious weakness with the Shorrocks index is that it is insensitive to off-diagonal movements in the transition matrix (i.e. transitions from state *i* to state *j*, $i \neq j$) so that the same index can be generated by rather different underlying transition matrices.

Inference, and thus formal comparisons between the cohorts, can be based on the asymptotic properties of $S(P)$. As shown by Schluter (1998), $S(P)$ is asymptotically normally distributed with variance:

$$V(S(P)) = \frac{1}{(J-1)^2} \sum_{j=1}^{J} \frac{p_{jj}(1-p_{jj})}{n_j} . \qquad (3.2)$$

The values of the Shorrocks mobility index and associated standard errors computed from the transition matrices in Table 3.1 are:

	$S(P)$	standard error
Cohort 8	0.7457	0.00860
Cohort 9	0.6752	0.01284
Cohort 10	0.7321	0.01178
Pooled	0.7244	0.00603

Comparing the diagonal elements in the transition matrices for Cohort 8 and Cohort 9 reveals that the probabilities of remaining in the same state are all higher in Cohort 9 than in Cohort 8. Hence the value of the Shorrocks index is lower for Cohort 9 than for Cohort 8. A formal test of the difference between two values of $S(P)$ drawn from independent populations can easily be computed using the properties of its asymptotic distribution:

Test for differences in $S(P)$	$z : N(0,1)$
Cohort 9 vs Cohort 8:	$z = -4.56$ ***
Cohort 10 vs Cohort 9:	$z = +3.26$ ***
Cohort 10 vs Cohort 8:	$z = -0.93$

*** denotes significantly different at 1%

Thus while there is some movement in the values of the index over time, and Cohort 9 appears to be significantly different from Cohorts 8 and 10, there would appear to be no significant change between Cohort 8 and Cohort 10 and thus little evidence for any structural change in the transitions patterns over time.

One useful way of comparing the transitions between different activities is to compute the *relative* transition rates, or transition ratios (see, for example, Stewart, 2003). Table 3.2 shows the transition ratios relative to those in employment as their main

activity at age 16 for each cohort and the three cohorts combined. Thus, for the pooled data, those in FTE at age 16 are more than 10 times more likely to be in FTE at age 18 than those in employment at age 16. An individual who is unemployed at age 16 is four times more likely to be unemployed at age 18 than someone in full-time or part-time employment, while someone on GST at 16 is 56% more likely to be unemployed at age 18 as someone in employment at 16. The probability of being in employment at age 18 is approximately twice as high for someone in employment at age 16 than for any other activity at age 16. Similar patterns are evident for each cohort taken separately, although there is evidence of a decline in the relative probability of being in FTE at age 18 if in FTE at 16.

The main conclusion to be drawn from these aggregate transition matrices and relative transition rates is that the majority of those that continue in FTE after year 11 either plan - or subsequently decide - to continue in FTE after they reach age 18 too. In contrast, only around one in 20 of those who enter employment at age 16 subsequently return to FTE by age 18; four in five are still in employment or are looking for work two years later.[18] Moreover, the two labour market states - FTE and employment - encompass over 80% of all young people at age 16. This apparent dichotomy between education and employment at age 16 is clearly important when assessing the likely impact of introducing a minimum wage for 16 and 17 year olds.

3.2 Disaggregated transition matrices

Of course, the aggregate transition matrices presented above assume population homogeneity. However, considerable variation in activity rates between different population sub-groups can be expected. In this sub-section, differences in transition probabilities and transition ratios for five characteristics of individuals and their families are reported. Transition matrices and relative transition rates are presented by: gender (male *vs* female); by educational attainment at year 11 (less than 5 GCSE passes at grade A*-C *vs* 5 or more GCSE passes at grade A*-C); by parental educational background (neither parent educated to at least A-level *vs* at least one parent educated to at least A-level); by family socio-economic group (SEG classes A and B (non-manual) *vs* SEG classes C, D and E (manual)) and by hourly pay for

[18] Those undertaking a programme of GST at age 16 are also extremely unlikely to return to FTE.

those in employment (i.e. on GST or in a job) (below median hourly pay vs above median hourly pay).

Table 3.3 disaggregates the transition matrices by gender. As is well-known, women are more likely to enter post-compulsory education than men, while men are more likely to seek employment at age 16. However, of those that do stay on in FTE at age 16, roughly equal proportions (50-60%) of men and women continue in education at age 18, and similar proportions (around 30%) leave FTE at age 18 to seek (and secure) employment. Of those that choose to enter employment at age 16, the vast majority of both men and women continue in employment at age 18. The corresponding relative transition rates in Table 3.4 reveal that, in the three cohorts combined, young people are between eight (for women) and 13 (for men) times more likely to be in FTE at age 18 if they are in FTE at age 16 than if they are in a job at age 16. Unemployment is also persistent, with a relative rate of around four for both men and women.

Differences in transition probabilities and ratios according to education attainment at age 16 are shown in Tables 3.5 and 3.6. The median number of GCSE passes at grades A*-C is 4, and hence this is the cut-off used to distinguish two sub-groups of the population - those with 4 or fewer GCSE passes at grades A*-C, and those with 5 or more GCSE passes at grades A*-C. As can be seen in Table 3.5, over 90% of those with 5 or more GCSE passes at grades A*-C stay in FTE after year 11, compared with just 50% of those with less than this number. Many of those in the higher attainment group who do leave FTE after year 11 find their way back into FTE by age 18 (although the numbers here are relatively small and so should be regarded with some caution). In contrast, those from the lower attainment group who leave FTE at age 16 have a very low probability of moving back into FTE by the time they are age 18.

The relative transition ratios in Table 3.6 illustrate an interesting phenomenon. Using the pooled data, among the lower attainment group, those who stay in FTE have a 14 times greater chance of being in FTE at age 18 compared with those who move into employment at age 16. The comparable ratio is less than four times greater for those from the higher attainment group. This is basically because of the leakage back into

FTE from employment for this latter group – almost 18% of those who enter employment at 16 are back in FTE two years later.[19]

The impact of differences in the education background of parents on the transition probabilities and ratios of 16 year olds are examined in Table 3.7 and Table 3.8. The population is divided into two groups according to whether neither parent was educated to A-level (and/or degree level) or at least one parent was educated to this level. Approximately 65% of individuals in the YCS cohorts under consideration in this report have neither parent educated to A-level standard.[20] There are clear differences in FTE participation at age 16 between those with neither parent educated to A-level and those with at least one parent educated to this level. The former have an FTE participation rate of around 65%, while for the latter it is in excess of 80%. There are also differences in the degree of persistence in FTE between the two groups which magnifies the difference in FTE participation at age 16. As a result, FTE participation rates at age 18 differ more than at age 16 between the two groups. For students with at least one parent educated to A-level, the higher retention in FTE, together with greater leakage back into FTE from jobs and unemployment at age 16 produces an overall FTE participation rate at age 18 in excess of 50%. This compares with a figure of less than 35% for the children of parents who did not take A-levels.

Differences in transitions rates and ratios by family socio-economic group (SEG) are shown in Tables 3.9 and Table 3.10. The SEG classification groups together people with jobs of similar social and economic status. In the YCS, SEG is constructed for the respondent's father and mother where applicable, and a general family SEG is derived.[21] The two groupings considered are non-manual (professional and managerial and other non-manual) and manual (skilled, semi-skilled and unskilled manual). There are also a number of respondents who cannot be allocated to a SEG, typically because neither of the respondent's parents is in a full-time job.

[19] However, once again, the numbers in this category are small and therefore should be viewed with some caution.
[20] Of course, there is some potential for measurement error in children reporting the education achievements of their parents.
[21] The SOC2000 classification has necessitated a revised taxonomy (the National Statistics Socio-Economic Classification (NS-SEC)) for Cohort 11 onwards.

FE participation for the non-manual SEG families is in excess of 80% at age 16, and more than half are still in FTE two years later. In contrast, FE participation of the manual SEG families is only around 60%, and is less persistent in that only around one third of the cohort is in FTE at age 18, while more than half are in employment or on GST. These differences in activity rates and transitions are large and are of the same order of magnitude to those for differences in parental education shown in Table 3.7 and Table 3.8 above. They are also clearly related.

Finally, Table 3.11 presents transition matrices by hourly pay for those in employment or GST at age 16.[22] Hourly pay in YCS surveys is derived from responses to questions on weekly (or monthly etc) take-home pay, and weekly hours of work. Errors in either or both of these can result in misleading estimates of hourly take-home pay.[23] Individuals are categorised according to whether their pay is above or below the median hourly pay. While the sample sizes restricted to just those in employment or on GST are fairly small for the separate cohorts,[24] the stability in the patterns of activities and transitions is evident and a number of features are worth noting. First, 80% of those in the higher pay group are in employment rather than on GST. This is an indication that, at least in terms of take-home pay, GST is very much a second-best option. Second, over 80% of those in employment or on GST at age 16 are still in one of these two categories at age 18, irrespective of their earnings. Third, earnings levels would appear to have little or no impact on the likelihood of individuals returning to FTE. Table 3.9 therefore presents *prima facie* evidence that

[22] Earnings in the YCS data are recorded as *take-home pay* in £ per hour for all those with some earnings (even if employment is not their main activity) in Cohort 8 and Cohort 9, but as a banded measure (<£2, £2-3, £3-4, £4-5, £5-6, £6-7, £7-8, £8+) only for those in employment or on GST in Cohort 10. Median pay is estimated to be £1.53 per hour, £2.17 per hour and £2-3 per hour in Cohorts 8, 9 and 10 respectively.
[23] The LFS direct measurement of hourly pay (from those paid hourly) differs somewhat from the derived measure (obtained as earnings divided by hours). Unfortunately, there is no direct measure available in YCS since hourly pay is not explicitly recorded, and hence only a derived measure is available. However, further detailed examination of the YCS pay data presented in Section 5 suggests that trimming the top and bottom of the distribution of wages to lessen the impact of measurement error in hourly pay does not significantly affect the moments of the pay distribution.
[24] They are 1,046, 653 and 663 for Cohorts 8, 9 and 10 respectively.

once an individual has decided to enter the labour market at age 16, their level of earnings has little impact on their subsequent labour market decisions.

3.3 Detailed transition matrices

This sub-section examines differences in transition rates according to the nature of the post-compulsory education undertaken, differentiating between alternative forms of FE at age 16 and also between different types of HE education at age 18. The transition matrices and relative transition ratios are presented in Table 3.12 and Table 3.13 respectively.

In the first transition matrix presented for each cohort, three forms of FTE at age 16 are distinguished. These are:

FTE acad only:	Academic route: A-levels and/or AS-levels only
FTE voc only:	Vocational route: GNVQ, NVQ, BTEC, City & Guilds etc only
FTE mixed:	A mixture of academic and vocational qualifications, including (possibly resitting) GCSEs

In the second transition matrix for each cohort in Table 3.12, those in FTE at age 16 are categorised according to whether respondents indicated that they were “currently in a full-time or part-time job or government supported training” having already indicated that their current main activity was in “full-time education at a school or college”. Thus these individuals are classified as FTE and working, or FTE and not working.

At age 18, those continuing in FTE are classified according to whether they are registered for a degree in the HE sector (FTE degree), or for some other form of FTE including further academic education at a lower level than degree level, and/or studying for additional vocational qualifications (FTE other).

As can be seen, around half of all those undertaking FTE at age 16 are pursuing a purely academic qualification route, and these represent around 35% of the age group. Of these, half are undertaking a degree two years later. In contrast, those engaged in studying for vocational qualifications at age 16 are unlikely to be registered for a degree two years later although 30-35% are still in FTE.

Approximately 40% of those undertaking vocational qualifications at age 16 are in employment at age 18. This is twice the proportion of those that take the academic route at age 16. Finally, around one quarter of (the small numbers of) individuals who take a mixture of academic and vocational qualifications at age 16 are registered for a degree two years later, while slightly more are engaged in FTE but not at degree level. A further 30% are in employment.

Differences according to whether those in FTE are working while studying are small in general, with a slight preference for those who work while they study to undertake degree-level HE, but also a greater tendency to leave FTE and get a job at age 18.

The primary conclusion from this section is that the choice between education or employment at age 16 is effectively permanent and irreversible (at least by age 18). Those that choose FTE at age 16, especially if they select the academic route, are considerably more likely to remain in FTE over the following two years. Moreover, they are also much more likely to then register for a degree following the completion of their FE course. Those that opt to leave FTE after year 11 and join the labour market tend to stay with this decision - there is very little 'leakage' back into FTE (of any kind) at age 18 from those who are in employment or on GST (or unemployed) at age 16.

Differences between the YCS cohorts are slight and may, in any event, be purely due to sampling variability. An interesting feature of the period covered by the three cohorts under consideration is that both sweeps of Cohort 8 predate the introduction of the (youth) minimum wage in April 1999, both sweeps of Cohort 10 post-date its introduction, while Cohort 9 straddles the year in which a minimum level of pay for those aged 18 came into effect. The relevance of this observation is that if pay was an important determinant of individuals' decision-making at age 16, or at age 18, then it might be expected to have been evident in differences in the transition matrices between the three cohorts at age 16 and/or age 18. However, there is no real evidence to suggest that individuals in the latest cohort have a stronger tendency to join the labour force at age 16 than those in the earlier cohorts despite the higher earnings they may now expect from age 18. Nor do the transition matrices suggest that behaviour at age 18 changed between Cohort 8 and Cohort 9 following the

introduction of the NMW. Coupled with the findings in Table 3.11 that, for those in employment or on GST, differences in pay appear to have little or no effect on transition probabilities, the tentative conclusion from this section is that pay does not appear to be a dominant factor in the decision process at age 16.

An important caveat is that all the binary comparisons presented in this section do not control for other differences between individuals which may impinge on their selection of activities. The multivariate empirical modelling strategy presented in the next section enables these comparisons to be made after controlling for the other factors which affect their decisions.

4 The determinants of labour market outcomes at age 16

This section reports estimates of empirical models of various labour market outcomes at age 16 using data drawn from YCS Cohort 11, sweep 1 which took place in Spring 2002 for the cohort of 16 year olds who completed their compulsory schooling in Summer 2001.[25] These data are the most recent available and thus provide the most pertinent information for investigating the current determinants of the education, training and labour market decisions and outcomes of 16 year olds. While labour market transitions for this Cohort cannot be investigated (since these individuals will not be re-surveyed until they are aged 18 in early 2004), the analysis presented above for Cohorts 8, 9 and 10 suggests that these transitions will exhibit considerable persistence and stability of over time.

In sub-section 4.1, multinomial models are specified and estimated for the various activities at age 16 conditional on a range of individual and family background variables which are likely to impact upon the decision that individuals make at the end of their compulsory schooling. The determinants of the probabilities of the five different outcomes considered in the aggregate transition matrices in Section 3 are empirically determined and the estimates used to predict the probabilities of the different outcomes conditional on individual and family characteristics. Comparisons between different population subgroups are then made.

In sub-section 4.2, the determinants of wages for those individuals in jobs or on GST (i.e. those working) at age 16 are considered. There is a well-known sample selection issue in estimating such wage equations since the sub-group of those age 16 who are working is unlikely to be a random sample from the whole population. Selectivity-biased corrected wage equations are thus presented in order to investigate the determinants of wages across the whole population of 16 year olds.

4.1 The determinants of education and employment decisions at age 16

In this sub-section, multinomial logit models of the decisions between the different activities (defined as FTE, GST, Job, Unemployment and 'Other' as in the transition

[25] We would like to thank Tim Thair at DfES for making these data available.

matrices in the previous section) at age 16 are estimated. Formally, the model specification can be written as:

$$P_j = P(y = j) = \frac{\exp(\beta_j' x)}{\sum_{k=1}^{J} \exp(\beta_k' x)}, \quad j = 1,...,J, \tag{4.1}$$

where *j* indexes the different choices available (see, for example, Greene, 2003). A normalisation is required to identify the model, and this is typically to arbitrarily set one of the $\beta_k = 0$ (say, $\beta_1 = 0$) as the comparison group so that the estimated coefficients measure the change relative to this base group.

The results from estimating a multinomial logit specification which captures the important influences on decisions at age 16 are presented in Table 4.1.[26] The base category chosen to identify the model is the FTE outcome, and thus the coefficients presented in the table for the other four outcomes (GST, Job, U/E and Other) measure the change in probability relative to the choice of FTE at age 16. Thus, for example, *ceteris paribus*, being male significantly increases the chance of an individual being in GST or a job as compared to being in FTE at age 16. However, in general, the interpretation of the coefficients in the multinomial logit specification is not transparent. For example, while the coefficient on male is positive for both the outcomes GST and Job, being male actually decreases the probability of being in a job relative to being in GST since 0.181 < 0.505. Moreover, it is not simple to decipher the magnitude of the impact on the probabilities of the different outcomes from the values of the individual coefficients.

One solution to the first of these difficulties in interpretation is to calculate 'relative risk ratios' (*RRR*) which yield the 'risk' of a category (relative to the base category) for a one unit change in any particular x_i. That is,

$$RRR_{ij} = \frac{P_{ij}}{P_{i1}} = \frac{P(y = j \mid (x_i + 1))}{P(y = 1 \mid x_i)} = \exp(\beta_{ij}), \quad j = 2,...,J. \tag{4.2}$$

[26] Variable descriptions and summary statistics are presented in Appendix B.

Table 4.2 converts the coefficient estimates in Table 4.1 into their corresponding relative risk ratios.[27] Thus, for otherwise similar individuals, the relative risk of being on GST over FTE is 66% greater for males than females, and 20% greater of being in a job. However, they are 10% less likely to be unemployed. It can be seen that the younger individuals within the cohort (age 16 at January 2002), non-whites, and those who attended independent schools are significantly more likely to be in FTE than in any other activity. With regard to qualifications, the effects are large and dramatic. Thus, for an individual with eight or more GCSEs at Grade A*-C, compared to someone leaving year 11 with no GCSE qualifications, the relative risk of being unemployed rather than in FTE is only 2%. That is, the individual with no GCSE qualifications is 50 times more likely to be unemployed than on FTE compared to the individual with eight or more GCSEs at Grade A*-C.

Similarly low relative risks are reported for the other activities for those who achieve five or more GCSEs at grades A*-C (representing over half of the cohort – see Table B1). However, there is little difference in the relative risks for those who achieve between one and four GCSEs at grades D-G and those with no GCSE qualifications.

The relative risk of unemployment is lower for the off-spring of parents who are home owners and are both present in the household, but the impact of these factors on the other outcomes (relative to FTE), and of parental education on all outcomes (relative to FTE), is small in general, perhaps because of the dominance of the socio-economic classification (SEC) of the family which reveals that, relative to the omitted category (higher professionals) and SEC2 (lower professionals), the relative risk of *not* remaining in FTE post-16 is significantly greater for all other SEC groups. The relative risk of being on GST is about 60% greater, while the relative risk of being unemployed is approximately double, *ceteris paribus*.[28]

The impact of the covariates on the probabilities of each of the outcomes can be assessed by examining the marginal effects. The marginal effects measure the

[27] Of course, the significance levels for the RRR_{ij} s are the same as in Table 4.1 for the β_i s and hence are not repeated.

[28] Some caution is needed in interpretation however, since the number unemployed is small – less than 5% of the sample.

change in the probability of activity *j* for a change in the regressor x_i. These are obtained from differentiating equation (4.1) which gives:

$$\delta_{ij} = \frac{dP_j}{dx_i} = P_j\beta_{ij} - P_j\sum_{k=1}^{J} P_k\beta_k = P_j(\beta_{ij} - \sum P_k\beta_k). \qquad (4.3)$$

Thus the marginal effects, δ_{ij}, are dependent on all the *J* coefficient vectors and probabilities though the second term in equation (4.3) (see, for example, Greene, 2003).

Table 4.3 presents the marginal effects for the multinomial model estimates in Table 4.1.[29] *Ceteris paribus*, the probability of being in FTE is 0.032 (3.2%) lower for a male than for a female, while the probability of being on GST is 0.023 (2.3%) higher, and of being in a job is 0.011 (1.1%) higher. The sum of the change in probabilities across the five activities is, of course, zero. Large marginal effects are observed for those with high levels of GCSE qualifications relative to those with few or none and, relatively speaking, to those from the lower socio-economic classes (the sample proportions are given at the bottom of Table 4.3 for comparison). The 'gradient' of the effect of qualifications on the probability of being in FTE, and, therefore, of not being in employment or on GST or unemployed, is steep and the difference between the highest qualification band (8+ GCSEs at A*-C) and the adjacent band (5-7 GCSEs at A*-C) is particularly notable – the probability of being in FTE is 25% higher for the former than for the latter, even having taken account of the other differences between individuals. Those who attended an independent school in year 11 are 10% more likely to be in FTE at age 16 than those who did not, *ceteris paribus*.

When compared to the simple dichotomous divisions of the sample presented in the transition matrices in Section 3, it can be seen that the importance of the separate factors considered there – namely gender, GCSE attainment and parental education – is also shown by the multivariate comparisons presented in Table 4.1. The *relative* importance of each of the factors can be ascertained from examining the relative risk ratios in Table 4.2 or the marginal effects in Table 4.3. These show that, *ceteris*

[29] Given that the regressors are typically dummy variables, the marginal effects are actually reported as the change in probability, P_j, for a discrete change from $x_i = 0$ to $x_i = 1$, since a marginal change in say, being male, is clearly not interpretable.

paribus, it is high GCSE performance which is particularly important for determining the route taken at the end of year 11, while the impact of gender and parental education is smaller in general.

4.2 The determinants of wages at age 16

In this sub-section, the determinants of hourly wages at age 16 are investigated. Drawing on the literature which commenced with the work of Mincer (1974), an individual wage equation is specified of the form:

$$\ln w_i = \beta' x_i + \varepsilon_i \qquad (4.4)$$

where $\ln w_i$ is the log of hourly wages for individual *i*, and x_i is a vector of individual and job characteristics that determine wages. Recall that the wage data in the YCS is measured in terms of individuals' take-home pay. The vector of characteristics would typically include labour market experience and schooling, as well as a range of other control variables. However, given that the sub-sample of individuals in employment at age 16 (i.e. in a job or on GST) have all just completed compulsory schooling and hence have little labour market experience and identical amounts of schooling (11 years), these measures are not appropriate in this particular case.

Table 4.4 column (1) presents estimates of equation (4.4).[30] The vector x_i includes gender, ethnicity, disability/health problem, ability (as measured by GCSE attainment by the end of year 11), school type, and whether the individual is on GST. The results indicate that men earn $(\exp(0.130)-1=)$ 14% more than women and those with 8+ GCSEs at A*-C earn 17% more than those with no GCSE qualifications at the end of year 11. There are no significant differences in pay by ethnicity, age or health. However, those on GST earn significantly less than those in employment *ceteris paribus* - the magnitude of the difference is estimated to be $(\exp(-0.485)-1=)$ -38%. This confirms the bivariate comparisons presented in Table 3.11 which showed that 80% of individuals on above median earnings were in a job rather than on GST. But, in general, few individual characteristics are statistically significant, and only around one quarter of the variation in log pay can be explained by the wage equation.

[30] Of the 2,844 individuals in a job or on GST, hourly wage data are available for 2,150 (75.6%).

There are two related difficulties in interpreting the results in Table 4.4 column (1) as indicators of the determinants of wages at age 16. First, the sub-sample selecting to join the labour market at the end of year 11 is not a random sample of all aged 16 - it is biased towards those with lower GCSE attainment for example. In itself, this would not be a problem as long as all the appropriate conditioning variables are included in the wage equation - as GCSE attainment already is - and the resulting estimates would then be apposite for all individuals at age 16. Secondly, however, if there are *unobservable* characteristics which affect the decision to join the labour market, *and* these are correlated with the unobservable characteristics which impact upon the wage, then this will induce a bias in the estimates of the observable factors in the wage equation. Intuitively, this arises because the *x* vector is now correlated with the errors, ε, in the wage equation since the latter captures the unobservable factors which differ systematically between those in the sub-sample who work and those who do not. This well-known sample-selection problem has received considerable attention in the literature, most notably in the work of Heckman (1976, 1979). Its solution lies in jointly estimating the selection equation (i.e. whether to join the labour market or not) along with the wage equation, suitably corrected for the bias – see, for example, Vella (1998).

The estimates of the sample selection model are presented in column (2) of Table 4.4. The first set of estimated coefficients is for the wage determination equation suitably corrected for the sample selection bias. These coefficients are interpretable as the impact on wages for all individuals aged 16, irrespective of whether they are currently working or not. The coefficients are very similar to those in column (1), although the impact of qualifications on pay is now rather smaller and less significant.[31] The second set of coefficients is for the selection equation (for being on GST or in a job). These are quite similar to the multinomial logit results for 'GST' and 'Job' in Table 4.1 since they contain the same regressors, and the determinants of both outcomes are similar.

[31] One interpretation of this finding is that within the sub-sample who are working, there are very few individuals with high qualifications, and these receive higher wages reflecting their greater and exceptional ability. Column (1) reflects this result. However, measured across the whole of the labour market - as column (2) records - which includes rather more individuals of high ability, the premium to having high qualifications would be rather lower.

The importance of allowing for the selection into the labour market on the wage determination process can be examined by testing the magnitude of the correlation between the errors of the two equations, or equivalently, testing the significance of the selection term, λ, in the wage equation. The diagnostics reported in the notes to Table 4.4 reveal that the correlation is only significant at the 6% level and, consistent with this, that the selection term is significant at 10% but not at 5%. Thus there would appear to be only weak evidence for selectivity bias in the estimated wage equation.

Some sensitivity analysis has been undertaken to investigate the robustness of this finding, since it suggests that the decision to join the labour market and earnings at age 16 are only weakly correlated, conditional on gender, ethnicity, qualifications etc. First, the selection between employment (on GST or in a job) and non-employment (FTE, unemployed and other) was restricted to the choice between employment and FTE only since 'unemployment' and 'other' may not be choices that individuals have chosen. This only removes around 7% of the sample of those not working, and has little effect on the results. Second, there are some apparent outliers in measured hourly wages. Truncating hourly pay at the 95th percentile (£5.50 per hour) to remove these observations produces similar results to those in Table 4.4. Third, the addition of 10 regional dummies for the standard statistical regions reveals that those in Greater London and the rest of the South East tend to earn more and participate less, but the other coefficients are robust to the inclusion of these indicators. Fourth, certain industrial sectors tend to pay more than others. Retail sales, hotels and catering and construction together account for around 40% of employment at age 16. However, taking account of the industrial sector of employment does not affect the general tenor of the results in Table 4.4. Finally, the estimates are also robust to using the weights.[32]

[32] While all the transition matrices and bivariate comparisons presented in Section 3 use sampling weights to correct for differential non-response in the YCS (see Appendix A for further details), regression models are typically estimated without using weights. Weighting effectively assigns a greater importance/credibility/accuracy to one observation than another in the regression, and sampling procedures rarely justify this. Indeed, significant differences between weighted and unweighted estimates can arguably be interpreted as evidence of model misspecification – see DuMouchel and Duncan (1983). Here, the results produced when using the weights

The results from this sub-section on wage determination show that wages at age 16 are difficult to predict. In part, this is undoubtedly because of the small differences between individuals in terms of their experience and education at age 16, and the comparatively narrow distribution of hourly wages for those in employment. Even taking account of unobservable factors, which affect the decision to leave FTE and enter the labour market, does not significantly improve the estimates of the model of wage determination. Wages appear to be largely unrelated to the measurable differences between individuals at age 16.

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are little different from those presented in Table 4.4 which is encouraging in this respect.

5 Modelling the impact of introducing a minimum wage for 16 and 17 year olds

This section presents an alternative approach to modelling individuals' employment and education decisions at age 16. A theoretical framework is developed which describes the decision making process between these two states as a function of the wage offers, the rewards from undertaking FE (and possibly subsequently also HE) and the probability of successfully completing an FE programme of study. This framework is then used to simulate the impact of introducing a minimum wage under various assumptions concerning the distribution of ability to succeed in FE. The consequences of introducing a minimum wage for 16 and 17 year olds are assumed to be to alter the distribution of wage offers for those aged 16 in a deterministic manner. This is calibrated using data from the latest YCS undertaken in Spring 2002 (Cohort 11, sweep 1). In combination with the distribution of ability, these anticipated wage changes can then be used to produce estimates of the change in education, and thus employment, participation rates.

5.1 Model structure

At the end of year 11 (i.e. age 16) school leavers face a decision regarding their future participation in education - in particular, whether to leave education and search for a job or training scheme, or to remain in FTE at school/college. If they are rational and forward looking then they will do this by anticipating future income streams associated with each of these decisions. Remaining in FTE will initially be costly in terms of the opportunity cost, which is mainly lost earnings during the two years of FE. However, the expected future income stream may more than compensate for this. In particular, students successfully completing a course in FE (either A-levels or vocational qualification) may enjoy higher wages on entering work at age 18 than those who did not remain in FTE. In addition they will also be rewarded by the potentially valuable option of access to HE at age 18 which is likely to further boost future earnings. The individual must therefore make their choice by comparing the discounted expected earnings over their working life from leaving FTE at 16 and joining the labour force and from remaining in FTE and undertaking some FE.

If all individuals age 16 are identical and faced with the same inter-temporal problem, then the representative individual would choose to either work or to undertake FE. All

their counterparts, faced with the same problem, would follow suit. In such a world, either all or none would choose FE. In practice, only a proportion of individuals choose to continue in FTE. In the model, this population heterogeneity is assumed to derive from varying expected probabilities of success in FE across individuals. In turn, these differing chances of success will affect the expected pay-offs from staying on in FTE vs leaving education and joining the labour market. Moreover, individuals are assumed to be able to anticipate their probability of success in FE. This may depend, for example, on their prior educational success at school.

Certainly, there is a very strong correlation between GCSE performance at year 11 and the probability of participation in FE as shown in Figure 5.1. This presents data from YCS Cohort 11, sweep 1 which took place in Spring 2002 for the cohort of 16 year olds who finished compulsory education in Summer 2001. Students who achieved no GCSE passes at grades A*-C by the end of year 11 have only a 44% probability of remaining in FTE. This increases quite sharply and monotonically with GCSE performance, such that those with 5 passes at grades A*-C (the median) have a 72% FTE participation rate, and those with 10 or more passes at this standard have a participation rate of 97%. Moreover, using the same definitions as in sub-section 3.3, it is evident that the purely academic FE route (A-levels and AS-levels) tends to be chosen predominantly by those who have been more successful in examination at GCSE level, while the vocational FE route (GNVQ, NVQ etc) tends to be chosen by those with fewer A*-C GCSE passes. The remainder of those participating in FTE post-16 are studying a mixture of academic and vocational qualifications.

In short, it is expected that students with a higher likelihood of success in FE will be more likely, *ceteris paribus*, to participate in FE. Students with expected probabilities of success in FE below a certain threshold level will leave education and join the labour market. This is the crux of the approach used in the model developed below.[33]

Thus, at age 16, the individual faces a choice of whether to participate in FE or to join the labour market. The choice of activities is denoted i where:

[33] A similar concept of probability of success has been used by Altonji (1993) to model returns to education under uncertainty.

$$i = \begin{cases} W \\ E \end{cases}$$

where W is work and E is FE. S/he will choose E if the discounted expected future income stream from education is greater than the alternative option of working, given uncertainty about the outcome of E (i.e. whether or not s/he is likely to succeed). The two choices are examined separately below:

***W*: Work at age 16**

If an individual chooses work at age 16 (*W*), they receive a wage offer, and this wage is assumed to be fixed until age 18.[34] The wage offer is modelled as a draw from a random distribution which is assumed to be known, *ex-ante*, and an expected wage is formulated, $E(w_{16})$, based on the individuals' distribution. The discounted value of this wage is denoted $V_{16} = \phi_{16} E(w_{16})$, where ϕ_{16} is an appropriate discount factor over the two year period from age 16 to age 18.

At age 18, the individual is assumed to redraw a wage from another distribution. Again the distribution is assumed to be known and the expected wage received at age 18 is $E(w_{18} \mid i = W)$. This is again assumed to be fixed thereafter. The discounted value of this wage is denoted $V_{18} = \phi_{18} E(w_{18} \mid i = W)$, where ϕ_{18} is a discount factor over the working lifetime from 18 until retirement.[35]

***E*: FE at age 16**

If an individual chooses FE at age 16 (*E*), the choice is subject to the uncertainty that after two years study at age 18, s/he may be 'unsuccessful' in completing the course.[36] For simplicity, it is assumed that the student will be successful with probability p. In turn, the realised outcome (success or otherwise) affects the

[34] More realistically, individuals receive a wage offer which summarises a wage profile for the subsequent two years.

[35] The discount factors ϕ_{16} and ϕ_{18} are:

$$\phi_{16} = \int_0^2 e^{-rt} dt = \frac{1 - e^{-2r}}{r} \quad \text{and} \quad \phi_{18} = \int_2^L e^{-rt} dt = \frac{e^{-2r} - e^{-Lr}}{r}$$

where *r* is the annual rate of interest and careers are *L* years long.

[36] More loosely translated, the individual may not enhance the expected value of their future wage offer distribution.

subsequent (expected) pay-offs. If successful, then the student has the option of either entering the labour market, or continuing into HE. This decision will again be solved optimally, but is not formally modelled here. Instead, the option value if qualified (*Q*) in FE is denoted V_{18}^{Q}; this is the discounted value of all possible future income flows under uncertainty having been successful in FE at age 18.

With probability $1-p$, the student will be unsuccessful in FE. In this case they are assumed to be in the same situation as they would have been without FE (i.e. unqualified at age 18). Hence, along with individuals who have worked since age 16, they draw a wage from a distribution with the wage profile fixed thereafter. The discounted expected value is therefore V_{18} as previously.[37]

Given these two value functions, an individual will choose *E* over *W* if:

$$pV_{18}^{Q} + (1-p)V_{18} > V_{16} + V_{18}. \tag{5.1}$$

The left hand side equation (5.1) represents the expected lifetime value of pursuing FE at age 16. The right hand side captures the value of working from age 16. The individual's choice depends on their probability of success, and s/he will therefore choose *E* if:

$$p > p^{*}, \tag{5.2}$$

where

$$p^{*} = \frac{V_{16}}{V_{18}^{Q} - V_{18}}. \tag{5.3}$$

Finally, in order to model aggregate FE participation (and hence aggregate employment participation), it is assumed that, first, each student knows their chances of succeeding on the FE program, p, *ex-ante*. As a result they will be able to optimally choose whether or not to remain in education according to the value of the

[37] This is a simplification, since in practice their wages may be lower (because their failure in FE may be interpreted as a signal by employers that they are a poor potential employee) or higher (because they accrue some educational/training benefits even though they are unsuccessful in FE) than if they had not attempted FE at age 16.

threshold probability, p^*. Secondly, individuals are assumed to be heterogeneous with respect to their abilities. The distribution of p in the population of school leavers is captured by the distribution function, F. Therefore a proportion $1-F(p^*)$ of the population will have a sufficient chance of success (i.e. $p > p^*$) to optimally choose FE. The fraction choosing E, denoted θ. is therefore:

$$\theta = 1 - F(p^*). \tag{5.4}$$

5.2 The effect of a minimum wage for 16 and 17 year olds

Now consider the effect of introducing/changing a minimum wage for 16 and 17 year olds in this framework. This change will only affect the distribution of wages for 16 and 17 year olds[38] and therefore impact only on V_{16}. Differentiating equation (5.4), the impact of a change in the wage offer distribution for 16 and 17 year olds on the participation rate, θ, is given by:

$$d\theta = -\varepsilon \frac{dV_{16}}{V_{16}}, \tag{5.5}$$

where ε is a quasi-elasticity of changes in wages at age 16 and 17 on education participation:

$$\varepsilon = p^* f(p^*), \tag{5.6}$$

where f is the density function associated with the distribution function F. Since p is not observable, ε may be written in terms of FE participation which is observed. In particular, given the level of participation, $\hat{\theta}$, in the population and a distributional assumption regarding F, the threshold value of p can be calculated as:

$$p^* = F^{-1}(1-\hat{\theta}),$$

using equation (5.4), so that

$$\varepsilon = F^{-1}(1-\hat{\theta}) \cdot f(F^{-1}(1-\hat{\theta})). \tag{5.7}$$

Note crucially that the effects (via ε) come entirely through the distribution function of educational abilities in the population, *F*.

[38] This is assumed to be the first order effect – there may be an impact on pay differentials and thus on wages for those aged 18 and over following the introduction of a minimum wage for 16 and 17 year olds.

In order to assess the impact of a minimum wage, w_{min}, for 16 and 17 year olds on participation in education and employment as described in equation (5.5), two pieces of information are required in order to calibrate the model. First is the effect of a minimum wage on expected wages at age 16 to 17 (i.e. on V_{16}). Second is the value of the quasi-elasticity, ε. These are described in the next two sub-sections.

5.3 Quantifying the minimum wage effect on expected earnings

The effect of a minimum wage on participation depends first on the percentage change in expected wages as a result of the imposition of a minimum wage (i.e. on dV_{16}/V_{16}). Recall that wages are assumed to be drawn from a distribution of wage offers. Introducing a minimum wage will truncate the left-hand tail of this wage offer distribution (by ensuring that nobody earns less than w_{min}), thus increasing the expected wage. The first task is to quantify the magnitude of this effect.

At one extreme, the truncation may produce a spike at the minimum wage, with all those previously earning less than the minimum now massed at w_{min}. At the other extreme, all pay differentials may be maintained, so that the distribution of wage offers shifts to the right by the difference between w_{min} and the lowest wage in the distribution. Unfortunately, the likely impact on the distribution of wages for 16 and 17 year olds is unknown, although it will clearly be somewhere between these two extremes. However, the evidence from the introduction of the adult minimum wage and youth Development Rate and their subsequent uprating as reported in successive LPC reports is that there tends to be more bunching at the bottom end of the pay distribution (and thus a squeezing of differentials at the lower end), with little impact on the distribution of pay further up the pay distribution. Hence while clearly providing a lower bound on the increase in the expected wage, the maintained assumption in the calculations reported below is that the distribution will be truncated at w_{min}, with all those earning less than w_{min} subsequently being paid the minimum wage.

The earnings data are again taken from the first sweep of Cohort 11 which records pay in Spring 2002. Individuals' hourly pay is reported in the YCS based on their

responses to two questions on take-home pay and hours worked. The observed distribution is interpreted as representing the underlying distribution of wage offers. As shown in Table 5.1, Panel A, the mean value of hourly take-home pay for all those reporting earnings is £3.63 per hour, and this is interpreted as the expected value of a random draw from the distribution of wage offers.[39] Figure 5.2 graphically presents the distribution of hourly wages reported in the data in the form of a histogram along with its empirical (kernel) density.

Disaggregating the distribution of hourly pay according to the three groups in employment reveals an interesting pattern as shown in the remaining rows of Table 5.1, Panel A and in Figure 5.3. Those on GST earn significantly less (mean: £2.44 per hour) than those in full-time or part-time employment (mean: £3.86 per hour) and those in FTE and working (mean: £3.88 per hour). Indeed, the latter two groups earn very similar pay rates as evidenced by the summary statistics in Table 5.1, Panel A and their empirical density functions in Figure 5.3. Therefore, in the simulations presented below, separate analyses are provided, first, for all those in employment, and second, for those in employment excluding those on GST.[40]

As discussed above, the minimum wage is assumed to truncate the distribution of wage offers from below at $w_{\min}$. For example, introducing a minimum take-home pay of £2.00 per hour for individuals in employment or on GST (mean: £3.22 per hour) would shift all those earning less than £2.00 per hour (which represent 22% of the observations as reported in Table 5.1, Panel B) to the minimum of £2.00 per hour. A

[39] There is potential measurement error in recording pay and hours. However, excluding ('trimming') the top and bottom 5% most extreme observations changes the mean hourly pay by very little (it is reduced by 12p to £3.51), and the median hourly pay is £3.50 as shown in Table 5.1.

[40] The advantage of using only those in employment as their main activity is that the selection of jobs is more representative of the opportunities for those seeking to join the labour market at age 16 (rather than including those who are simply working (predominantly part-time) while they are in FTE as their main activity). The disadvantage is that the individuals who choose employment are not a random sample of the population of all those aged 16, and thus there is a selection bias in the observed wage offer distribution. Which is the more appropriate depends on what happens after a minimum wage is introduced, but the first order effects at the margin are probably indistinguishable given the close similarities in the observed wage distributions for these two groups.

random draw from the resulting distribution of wage offers (based on the truncated empirical density) will then give an expected wage of £3.34 per hour (i.e. the mean of the truncated distribution). Therefore V_{16} will have increased from £3.22 to £3.34 or, expressed in percentage terms, $dV_{16}/V_{16} = 3.7\%$. This is shown in the first row of Table 5.2. The same calculation may be similarly performed for any level of $w_{\min}$ and the size of dV_{16}/V_{16} calculated.

Table 5.2 presents the results of this analysis for various levels of minimum wage for 16 and 17 year olds using the assumption that the minimum will truncate the wage distribution in the manner described above. The mean (expected) wage and the percentage increase in V_{16} are reported for a range of values for $w_{\min}$. Similar calculations are also reported when those on GST are excluded. Given that the wage distribution for those in jobs lies to the right of that for those on GST as shown in Figure 5.3, the minimum wage has rather less impact on the expected wage from the truncated distribution as shown in the third and fourth columns of Table 5.2.

5.4 Distributional assumptions regarding probability of success in FE, *p*

The second piece of information required to calibrate the model described above is the elasticity of participation to changes in expected wages denoted ε. This requires an assumption regarding the underlying distribution, $F(p)$, of the probability of success in FE.

A simple benchmark case

In this sub-section, a 'benchmark' case is chosen as an illustration, namely the uniform distribution. This corresponds to the assumption that all individuals are of *equal ability* in terms of their probability of successfully completing their FE studies. It also provides the simplest case for characterising the distribution function. In particular, the elasticity ε may be calculated directly.[41] Subsequently, alternative distributional assumptions for F are examined with selection based on reference to indicators of prior educational achievement at age 16.

[41] In this case $F(p) = p$ and $f(p) = 1$, and therefore $\varepsilon = 1 - \hat{\theta}$.

Table 5.3 analyses the effects of various levels of minimum wage set at 50p intervals based on this benchmark. Aggregate education participation, $\hat{\theta}$, at age 16 is 70.7%, based on the responses reported in sweep 1 of Cohort 11.[42] This yields an elasticity of participation of $\varepsilon = 0.29$. A minimum wage for all individuals in jobs or on GST set at, say, £3.00 per hour results in an increase in the expected wage of 14.6%. This will benefit those choosing to work and, as a result, have a negative impact on FTE participation rates. In this case, FE participation falls to 66.5%, a decrease of 4.2 percentage points. Excluding those on GST, the impact is smaller (-1.3 percentage points) since the proportionate increase in the expected wage is then only 4.4%. Using this benchmark case, at all but very highest levels of minimum wage, the impact on participation in FE is predicted to be fairly small, especially if those on GST are excluded from the coverage.

Alternative distributional assumptions

Finally, a number of other potential distributions of p over the population of school leavers are considered utilising the Beta distribution function to describe F. The Beta distribution is governed by two parameters, α and β.[43] The benchmark uniform distribution is the special case when $\alpha = \beta = 1$. Other parameter values can generate a very flexible family of distributions.

Two particular cases are examined here. First, the situation where there is inequality in the distribution of educational ability, and thus in p, is considered. This inequality is presumed to generate a high concentration of individuals at each end of the spectrum of p such that there are many individuals of lower ability (p close to zero)

[42] Comparable figures for the first sweep of Cohort 8, Cohort 9 and Cohort 10 are 71.3%, 69.2% and 71.4% respectively. These differ slightly from the row proportions reported in the transition matrices in Table 3.1 (70.3%, 69.6% and 73.1% respectively) since the latter are based on only those respondents who returned questionnaires in both sweeps and, despite reweighting to account for differential non-response, there are some slight differences (see also Appendix A).

[43] The Beta density function is defined as

$$f(x) = \frac{\Gamma(\alpha+\beta)}{\Gamma(\alpha)\Gamma(\beta)} x^{\alpha-1}(1-x)^{\beta-1},$$

with $0 \le x \le 1$, $\alpha > 0$, $\beta > 0$, and $\Gamma(a) = \int_0^\infty u^{a-1}e^{-u}du$.

and many of higher ability (*p* close to one), but relatively few of intermediate - moderate – levels of ability. This distribution can be argued to capture the features exhibited by the distribution of GCSE attainment at age 16. Figure 5.4 displays the distribution of the number of GCSE grades A*-C that students had achieved at the end of their compulsory schooling (year 11) for Cohorts 9, 10 and 11. The bimodality in the distribution of success measured by this criterion is very evident. Around one quarter of school leavers report no GCSE grades at A*-C at the end of compulsory schooling, while another quarter achieve 9 or more GCSEs at this level. While there is evidence of some overall improvement over time (the average number of GCSEs at grades A*-C has increased from 4.35 to 4.81 between Cohort 9 and Cohort 11), the inequality in attainment at age 16 is very striking.

The inequality in the probability of success in FE is modelled using a Beta distribution with $\alpha = \beta < 1$, with lower values of α and β generating higher degrees of inequality. Two examples are considered: moderate inequality ($\alpha = \beta = 0.3$) and high inequality ($\alpha = \beta = 0.15$). Panel A of Figure 5.5 illustrates the two density functions for the probability of success in FE, *p*, which these parameter values generate, together with the uniform distribution depicting equal ability as used for the benchmark case considered above.

A second interesting case considered is a positively skewed distribution, with more individuals concentrated towards a *p* of one. Such a distribution suggests a world in which most individuals are able to succeed in FE. This skew towards one in the distribution of ability is modelled using a Beta distribution with $\alpha > 1$ and $\beta = 1$ with higher values of α generating higher levels of positive skew in the distribution. Two examples are considered: moderate skew ($\alpha = 2.5, \beta = 1$) and high skew ($\alpha = 5, \beta = 1$). These are illustrated in Panel B of Figure 5.5.

For the numerical simulations, minimum wages set at 50p intervals are considered for all individuals in jobs or on GST, and for just those in jobs. The FE participation elasticities are calculated based on each of the four distributional assumptions outlined above (moderate and high inequality and moderate and high skewness in ability) using equation (5.7), and the effect on participation calculated for each

separate case. The results are summarised in Table 5.4; calculated elasticities and FTE participation rates are shown for each of the assumed distribution of abilities.

In each case, FE participation decreases as the result of the imposition of a minimum wage, with greater reductions the higher the level at which it is set. The distributional assumptions clearly make a significant difference. If it is assumed that educational abilities are unequally distributed, then the effect on participation is even less than in the benchmark case considered previously. Under this scenario, changes in overall participation in FE are expected to be very small. If those on GST are excluded, for moderate inequality in ability, the model predicts a decrease in participation of only 0.1 percentage points for a minimum wage of £3.00 per hour. Even including those on GST, the reduction is only 0.2 percentage points. Essentially these changes are small because the elasticity is very low given that relatively few individuals are affected by the change in p^* as the probability mass is concentrated in the tails of the distributions (p close to zero or one).

In contrast, the scenario of a positive skew in educational abilities magnifies the impact of introducing a minimum wage. In this case, for moderate skew, there is a decrease in predicted FE participation for those in jobs of 2.3 percentage points for a minimum wage of £3.00 per hour. This is because a relatively large number of individuals are affected at the margin since more of the probability mass is concentrated at or near to p^*. Including those on GST increases this predicted effect to 7.6 percentage points.

According to the evidence provided by GCSE attainment at year 11 and illustrated in Figure 5.4, the distribution of ability in FE would appear to be highly unequal. Thus, of the three distributions considered in this section - uniform, inequality and positive skewness – it is that represented by (the high degree of) inequality that would appear to be most realistic. As a consequence, relatively few individuals are affected at the margin by changes in the expected wage or, equivalently, the participation elasticity is small. Changes in expected wages then have to be very large in order to significantly reduce participation in education. For reasonable values of a minimum wage for 16 and 17 year olds, the predicted change in participation in education is

therefore very small as seen above. Excluding those on GST further reduces the impact of introducing the minimum wage since this group would be disproportionately affected if included given their relatively low rates of pay.

Thus, the central conclusion from the simulations presented in this section of the report is that the predicted impact of introducing a minimum wage for 16 and 17 year olds on education participation is likely to be small.

6. Conclusions

An assessment of the potential impact of a minimum wage for 16-17 year olds on their education and labour market decisions is important if adverse effects - particularly on education participation - are to be avoided. As shown in Section 2, aggregate data can yield broad trends in the education and employment participation of young people. These broad trends may be suggestive although it is difficult to draw causal inferences of the kind necessary to evaluate the impact of introducing a minimum wage for this age group.

Section 3 illustrates how the YCS surveys can be used to examine the changing influences on individuals' decision making which give rise to the broad trends revealed by the LFS. The YCS data are a rich (and rather under-exploited) source of information on young people. Most importantly, they contain repeated observations on individuals in the years immediately following the completion of compulsory education. Thus the transitions between different activities - education and employment - can be traced and the influences on their decisions in the initial years of work and in FE can be investigated. The evidence suggests that the decision made at age 16 - either to remain in FTE or to enter the labour market - is strongly persistent, in that individuals are very likely to be in the same labour market state two years later. Many who remain in FTE, especially those who undertake academic FE study at age 16, are also still in FTE, mainly at HE level, at age 18. More importantly for this study, those who choose to enter the labour market at age 16 are extremely likely to still be in the labour market two years later. Indeed, almost 90% of those entering the labour market at age 16 (on GST, in a job or unemployed) are still in the labour market two years later.[44] Differences in the transition rates by gender, by GCSE attainment and by parental education and family background are also examined and some large disparities in the proportions in FTE or in employment between different sub-groups of the population are revealed. However, the decisions made at age 16 are still largely persistent within each sub-group.

Given the persistence of the choice at age 16, the varying influences on the activities chosen or undertaken at age 16 are investigated in detail in Section 4. Controlling for

[44] Figures from Table 3.1, Cohorts 8, 9 and 10 pooled.

the multiple factors affecting the outcomes reveals that it is GCSE performance which is the dominant influence on the decision to remain in FTE or to leave education once other differences between individuals and their family backgrounds are taken into account. Section 4 also examines the determinants of wages at age 16 taking into account the non-random selection of individuals who work. Relatively narrow differences in wages make this a difficult exercise, and the results are rather weak.

Section 5 takes a different approach and calibrates a theoretical model of the decision process which explicitly takes into account the value of working *versus* the value of staying in FTE at age 16 expressed as a function of individuals' ability and the expected wage. While the effects of a minimum wage can be large under certain assumptions regarding the distribution of ability, under the distribution which accords most closely with the observed - highly unequal - distribution of GCSE attainment, the marginal impact on participation in FTE resulting from the introduction of a minimum wage (and therefore, symmetrically, on the decision to enter employment) is very small.[45] Essentially, this result arises because for all those with high ability, the value of remaining in FTE (given their high probability of success in FE) is still greater than any potential increase in their wages while they are 16 and 17 years old. According to this model therefore, a minimum wage will do little to deter the numbers remaining in FTE.

[45] The predicted fall in education participation of 0.1-0.2 percentage points from the introduction of a minimum wage at £3.00 per hour compares favourably to the predicted 3% anticipated increase in education participation to follow from the national roll-out of EMA in September 2004.

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Glossary

BCS	British Cohort Study
BHPS	British Household Panel Survey
EMA	Educational Maintenance Allowances
FE	Further education
FRS	Family Resources Surveys
FTE	Full-time education
GNVQ	General National Vocational Qualification
GST	Government-supported training
HE	Higher education
LFS	Labour Force Survey
LPC	Low Pay Commission
LPC4	Fourth Report of the Low Pay Commission (LPC, 2003)
NCDS	National Child Development Survey
NES	New Earnings Survey
NMW	National Minimum Wage
NVQ	National Vocational Qualification
RRR	Relative risk ratio
SEC	Socio-economic classification
SEG	Socio-economic group
YCS	Youth Cohort Study

Appendix A

The Youth Cohort Study (YCS) data

The first YCS took place in 1985. However, only data from the four most recent YCS cohorts are considered in this report. Data from Cohort 8, Cohort 9, Cohort 10 are used for examining transitions over time in Section 3, while activity, characteristics and pay data are taken from the first sweep of Cohort 11 for the analysis in Section 4 and Section 5. The dates and timing of the relevant YCS surveys are presented in Table A1.

Table A1: Recent YCS cohorts and sweeps

	1996	1997	1998	1999	2000	2001	2002
Cohort 8	sweep 1 Spring age 16/17		sweep 2 Spring age 18/19		sweep 3 Spring age 20/21		
Cohort 9			sweep 1 Spring age 16/17	sweep 2 Spring age 17/18	sweep 3 Spring age 18/19 sweep 4 Autumn		
Cohort 10					sweep 1 Spring age 16/17 sweep 2 Autumn		sweep 3 Spring age 18/19
Cohort 11							sweep 1 Spring age 16/17

The response rates by cohort and sweep for the four YCS cohorts utilised are as follows (DfES, 2003c):

	initial	response rate (%)			sample size
	sample size	sweep 1	sweep 2	sweep 3	at age 18
Cohort 8	24,500	65	64		10,130
Cohort 9	22,500	65	66	65	6,304
Cohort 10	24,500	56	74	71	7,238
Cohort 11	30,000	56			

The YCS data are weighted to bring them into line as far as possible with population estimates. High attainers and those in FTE are more likely to respond to the survey and the weights adjust for this differential non-response. However, while the YCS can provide estimates of education attainment and activity rates for young people, it is not the official source for these estimates. The YCS uses different definitions to the official measures and its results are subject to sampling error. Despite the complex weighting methodology, it is known that YCS tends to slightly over-estimate the proportion in FTE and GST at the expense of those in other education or training at age 18 – see DfES (2003c, 2003d) for further details.

Appendix B

Variable definitions and summary statistics

Table B1: Variable descriptions and weighted summary statistics

Variable description:	mean	std. dev.
male (base category: female)	0.506	0.500
age 16 at January 2002 (base category: aged 17)	0.682	0.466
ethnicity - white (base category)	0.875	0.331
ethnicity – black	0.022	0.148
ethnicity – asian	0.066	0.249
ethnicity – mixed/other	0.026	0.160
ethnicity – missing	0.010	0.098
disability/health problem	0.044	0.206
qualifications: 8+ GCSEs at A*-C	0.362	0.481
qualifications: 5-7 GCSEs at A*-C	0.149	0.356
qualifications: 1-4 GCSEs at A*-C	0.243	0.429
qualifications: 5+ GCSEs at D-G	0.176	0.381
qualifications: 1-4 GCSEs at D-G	0.027	0.163
qualifications: no GCSEs (base category)	0.043	0.202
independent school in year 11 (base: LEA or other school)	0.063	0.243
parents home owner (base: council or private rented)	0.759	0.428
living with both parents (base: living with one or neither)	0.728	0.445
1+ parent with at least degree	0.239	0.427
1+ parent with at least A-level	0.193	0.395
neither parent with A-level (base category)	0.567	0.496
living in workless household (base: at least one parent working)	0.057	0.232
SEC1: higher professional (base category)	0.150	0.358
SEC2: lower professional and higher technical	0.249	0.432
SEC3: intermediate	0.202	0.402
SEC4: lower supervisory occupations	0.108	0.310
SEC5: semi-routine and routine occupations	0.134	0.340
SEC6: other	0.157	0.364
Observations	16,707	

Table 2.1

Employment, unemployment and economic inactivity by education and age

PANEL A	age 16 and 17			age 18 to 21			all age 16 to 21		
column %	not in FTE	in FTE	*Total*	not in FTE	in FTE	*Total*	not in FTE	in FTE	*Total*
Employment	56.8	36.1	*41.3*	73.5	40.4	*59.6*	70.5	38.4	*53.4*
Unemployment	21.2	5.6	*9.5*	11.1	3.7	*8.0*	12.9	4.6	*8.5*
Inactivity	22.1	58.3	*49.2*	15.4	55.8	*32.4*	16.6	57.0	*38.1*
Total	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*

PANEL B	age 16 and 17			age 18 to 21			all age 16 to 21		
row %	not in FTE	in FTE	*Total*	not in FTE	in FTE	*Total*	not in FTE	in FTE	*Total*
Employment	34.6	65.4	*100.0*	71.6	28.4	*100.0*	61.9	38.1	*100.0*
Unemployment	56.1	43.9	*100.0*	80.4	19.6	*100.0*	71.2	28.8	*100.0*
Inactivity	11.3	88.7	*100.0*	27.6	72.4	*100.0*	20.4	79.6	*100.0*
Total	*25.2*	*74.8*	*100.0*	*58.0*	*42.0*	*100.0*	*46.9*	*53.1*	*100.0*

PANEL C	age 16 and 17			age 18 to 21			all age 16 to 21		
overall %	not in FTE	in FTE	*Total*	not in FTE	in FTE	*Total*	not in FTE	in FTE	*Total*
Employment	14.3	27.0	*41.3*	42.7	17.0	*59.6*	33.0	20.4	*53.4*
Unemployment	5.3	4.2	*9.5*	6.4	1.6	*8.0*	6.1	2.4	*8.5*
Inactivity	5.6	43.6	*49.2*	8.9	23.4	*32.4*	7.8	30.3	*38.1*
Total	*25.2*	*74.8*	*100.0*	*58.0*	*42.0*	*100.0*	*46.9*	*53.1*	*100.0*

Source: LFS Spring quarter 2003

Table 3.1

Simple transition matrices

YCS Cohort 8: Transition matrix

%	age 18 (1998)						row	weighted
	FTE	GST	Job	U/E	Other	Total	share	obs
age 16 (1996)								
FTE	56.25	5.58	29.69	4.42	4.06	100.0	70.33	7,124
GST	2.99	32.16	48.81	13.57	2.47	100.0	10.03	1,015
Job	4.22	13.37	69.34	7.49	5.58	100.0	10.71	1,085
U/E	11.22	6.26	40.27	27.29	14.96	100.0	4.88	494
Other	26.94	9.87	35.58	10.91	16.70	100.0	4.06	412
Total	41.95	9.29	36.61	7.05	5.11	100.0	100.0	10,130

YCS Cohort 9: Transition matrix

%	age 18 (2000)						row	weighted
	FTE	GST	Job	U/E	Other	Total	share	obs
age 16 (1998)								
FTE	57.39	4.87	29.53	4.36	3.85	100.0	69.61	4,388
GST	3.42	46.21	38.47	8.36	3.54	100.0	11.33	714
Job	5.65	11.28	71.45	5.86	5.77	100.0	11.94	753
U/E	5.10	9.75	32.12	31.73	21.30	100.0	4.88	308
Other	29.77	5.89	30.65	10.54	23.15	100.0	2.24	141
Total	41.93	10.58	35.70	6.47	5.33	100.0	100.0	6,304

YCS Cohort 10: Transition matrix

%	age 18 (2002)						row	weighted
	FTE	GST	Job	U/E	Other	Total	share	obs
age 16 (2000)								
FTE	52.54	4.55	30.97	4.65	7.30	100.0	73.11	5,292
GST	3.07	33.24	49.13	9.34	5.22	100.0	10.34	748
Job	6.39	7.32	73.61	7.24	5.44	100.0	9.51	689
U/E	3.86	8.39	46.53	25.58	15.64	100.0	4.75	344
Other	18.10	2.83	45.95	10.95	22.18	100.0	2.29	166
Total	39.94	7.92	37.98	6.52	7.65	100.0	100.0	7,238

Table 3.1 (continued)

Simple transition matrices

YCS Cohorts 8, 9 and 10 pooled: Transition matrix

%	age 18						row	weighted
	FTE	GST	Job	U/E	Other	Total	share	obs
age 16								
FTE	55.38	5.07	30.05	4.48	5.03	100.0	70.99	16,805
GST	3.14	36.54	45.92	10.79	3.61	100.0	10.47	2,478
Job	5.24	11.10	71.13	6.93	5.60	100.0	10.67	2,526
U/E	7.36	7.84	39.96	27.97	16.87	100.0	4.84	1,145
Other	25.45	7.46	37.01	10.84	19.24	100.0	3.03	718
Total	41.33	9.21	36.79	6.73	5.94	100.0	100.0	23,672

Table 3.2

Relative transition rates – simple transition matrices

YCS Cohort 8: Relative transition rates

			age 18	**(2000)**	
	FTE	GST	Job	U/E	Other
age 16 (1998)					
FTE	13.33	0.42	0.43	0.59	0.73
GST	0.71	2.41	0.70	1.81	0.44
Job	1.00	1.00	1.00	1.00	1.00
U/E	2.66	0.47	0.58	3.64	2.68
Other	6.38	0.74	0.51	1.46	2.99

YCS Cohort 9: Relative transition rates

			age 18	**(2000)**	
	FTE	GST	Job	U/E	Other
age 16 (1998)					
FTE	10.16	0.43	0.41	0.74	0.67
GST	0.61	4.10	0.54	1.43	0.61
Job	1.00	1.00	1.00	1.00	1.00
U/E	0.90	0.86	0.45	5.41	3.69
Other	5.27	0.52	0.43	1.80	4.01

YCS Cohort 10: Relative transition rates

			age 18	**(2002)**	
	FTE	GST	Job	U/E	Other
age 16 (2000)					
FTE	8.22	0.62	0.42	0.64	1.34
GST	0.48	4.54	0.67	1.29	0.96
Job	1.00	1.00	1.00	1.00	1.00
U/E	0.60	1.15	0.63	3.53	2.88
Other	2.83	0.39	0.62	1.51	4.08

YCS Cohorts 8, 9 and 10 pooled: Relative transition rates

			age 18		
	FTE	GST	Job	U/E	Other
age 16					
FTE	10.57	0.46	0.42	0.65	0.90
GST	0.60	3.29	0.65	1.56	0.64
Job	1.00	1.00	1.00	1.00	1.00
U/E	1.40	0.71	0.56	4.04	3.01
Other	4.86	0.67	0.52	1.56	3.44

Table 3.3

Transition matrices by gender
(male vs female)

YCS Cohort 8: Transition matrix by gender

%			age 18	(1998)			
Male	FTE	GST	Job	U/E	Other	Total	row share
age 16 (1996)							
FTE	56.49	6.96	28.73	4.53	3.29	100.0	66.07
GST	3.40	40.36	42.74	12.75	0.75	100.0	12.41
Job	3.01	14.93	71.86	9.10	1.12	100.0	12.28
U/E	9.72	7.80	43.72	30.90	7.85	100.0	5.22
Other	23.67	14.28	41.53	10.37	10.15	100.0	4.03
Total	39.57	12.42	37.06	7.72	3.22	100.0	
			age 18	**(1998)**			row
Female	FTE	GST	Job	U/E	Other	Total	share
age 16 (1996)							
FTE	56.03	4.33	30.56	4.32	4.76	100.0	74.74
GST	2.29	18.22	59.14	14.95	5.40	100.0	7.55
Job	5.92	11.20	65.82	5.25	11.81	100.0	9.09
U/E	13.00	4.41	36.15	22.99	23.45	100.0	4.52
Other	30.27	5.38	29.53	11.45	23.38	100.0	4.10
Total	44.42	6.05	36.13	6.35	7.06	100.0	

YCS Cohort 9: Transition matrix by gender

%			age 18	(2000)			
Male	FTE	GST	Job	U/E	Other	Total	row share
age 16 (1998)							
FTE	57.53	6.06	28.96	4.89	2.56	100.0	65.39
GST	3.32	58.27	27.10	8.91	2.40	100.0	14.81
Job	4.68	12.98	72.90	7.65	1.78	100.0	14.23
U/E	5.11	10.57	34.73	43.01	6.59	100.0	3.76
Other	22.08	13.32	37.70	21.44	5.46	100.0	1.80
Total	39.37	15.08	35.31	7.61	2.63	100.0	
			age 18	**(2000)**			row
Female	FTE	GST	Job	U/E	Other	Total	share
age 16 (1998)							
FTE	57.27	3.83	30.02	3.90	4.98	100.0	73.26
GST	3.61	24.03	59.38	7.34	5.64	100.0	7.90
Job	7.05	8.82	69.35	3.27	11.51	100.0	9.69
U/E	5.09	9.25	30.51	24.78	30.37	100.0	5.98
Other	34.87	0.97	25.98	3.31	34.88	100.0	2.67
Total	44.44	6.16	36.07	5.35	7.98	100.0	

Table 3.3 (continued)

Transition matrices by gender
(male vs female)

YCS Cohort 10: Transition matrix by gender

%			age 18	(2002)			row
Male	FTE	GST	Job	U/E	Other	Total	share
age 16 (2000)							
FTE	52.97	6.13	29.61	5.12	6.17	100.0	68.86
GST	3.10	39.54	43.90	10.54	2.91	100.0	13.01
Job	5.95	7.29	77.16	7.70	1.90	100.0	10.36
U/E	1.82	12.48	48.54	35.87	1.29	100.0	5.55
Other	22.61	4.74	56.84	13.63	2.18	100.0	2.22
Total	38.10	10.92	38.05	7.99	4.95	100.0	

			age 18	(2002)			row
Female	FTE	GST	Job	U/E	Other	Total	share
age 16 (2000)							
FTE	52.17	3.17	32.14	4.23	8.28	100.0	77.24
GST	3.03	22.95	57.66	7.37	9.00	100.0	7.74
Job	6.89	7.36	69.51	6.70	9.54	100.0	8.69
U/E	6.62	2.86	43.81	11.60	35.11	100.0	3.97
Other	13.97	1.08	35.98	8.50	40.47	100.0	2.36
Total	41.72	5.01	37.92	5.08	10.27	100.0	

YCS Cohorts 8, 9 and 10 pooled: Transition matrix by gender

%			age 18				row
Male	FTE	GST	Job	U/E	Other	Total	share
age 16							
FTE	55.66	6.47	29.06	4.81	4.00	100.0	66.73
GST	3.29	45.41	38.46	10.96	1.88	100.0	13.23
Job	4.27	12.38	73.53	8.30	1.52	100.0	12.21
U/E	6.11	9.94	43.55	35.02	5.37	100.0	4.93
Other	23.16	11.92	44.44	12.94	7.53	100.0	2.90
Total	39.07	12.67	36.90	7.77	3.59	100.0	

			age 18				row
Female	FTE	GST	Job	U/E	Other	Total	share
age 16							
FTE	55.12	3.83	30.92	4.18	5.94	100.0	75.25
GST	2.88	21.30	58.74	10.48	6.59	100.0	7.71
Job	6.53	9.39	67.92	5.11	11.05	100.0	9.13
U/E	8.66	5.65	36.23	20.64	28.83	100.0	4.74
Other	27.54	3.39	30.22	8.93	29.93	100.0	3.17
Total	43.58	5.75	36.67	5.68	8.30	100.0	

Table 3.4

Relative transition rates by gender
(male vs female)

YCS Cohort 8: Relative transition rates by gender

Male			**age 18**	**(1998)**	
	FTE	GST	Job	U/E	Other
age 16 (1996)					
FTE	18.77	0.47	0.40	0.50	2.94
GST	1.13	2.70	0.59	1.40	0.67
Job	1.00	1.00	1.00	1.00	1.00
U/E	3.23	0.52	0.61	3.40	7.01
Other	7.86	0.96	0.58	1.14	9.06
Female			**age 18**	**(1998)**	
	FTE	GST	Job	U/E	Other
age 16 (1996)					
FTE	9.46	0.39	0.46	0.82	0.40
GST	0.39	1.63	0.90	2.85	0.46
Job	1.00	1.00	1.00	1.00	1.00
U/E	2.20	0.39	0.55	4.38	1.99
Other	5.11	0.48	0.45	2.18	1.98

YCS Cohort 9: Relative transition rates by gender

Male			**age 18**	**(2000)**	
	FTE	GST	Job	U/E	Other
age 16 (1998)					
FTE	12.29	0.47	0.40	0.64	1.44
GST	0.71	4.49	0.37	1.16	1.35
Job	1.00	1.00	1.00	1.00	1.00
U/E	1.09	0.81	0.48	5.62	3.70
Other	4.72	1.03	0.52	2.80	3.07
Female			**age 18**	**(2000)**	
	FTE	GST	Job	U/E	Other
age 16 (1998)					
FTE	8.12	0.43	0.43	1.19	0.43
GST	0.51	2.72	0.86	2.24	0.49
Job	1.00	1.00	1.00	1.00	1.00
U/E	0.72	1.05	0.44	7.58	2.64
Other	4.95	0.11	0.37	1.01	3.03

Table 3.4 (continued)

Relative transition rates by gender
(male vs female)

YCS Cohort 10: Relative transition rates by gender

Male			**age 18**	**(2002)**	
	FTE	GST	Job	U/E	Other
age 16 (2000)					
FTE	8.90	0.84	0.38	0.66	3.25
GST	0.52	5.42	0.57	1.37	1.53
Job	1.00	1.00	1.00	1.00	1.00
U/E	0.31	1.71	0.63	4.66	0.68
Other	3.80	0.65	0.74	1.77	1.15
Female			**age 18**	**(2002)**	
	FTE	GST	Job	U/E	Other
age 16 (2000)					
FTE	7.57	0.43	0.46	0.63	0.87
GST	0.44	3.12	0.83	1.10	0.94
Job	1.00	1.00	1.00	1.00	1.00
U/E	0.96	0.39	0.63	1.73	3.68
Other	2.03	0.15	0.52	1.27	4.24

YCS Cohorts 8, 9 and 10 pooled: Relative transition rates by gender

Male			**age 18**		
	FTE	GST	Job	U/E	Other
age 16					
FTE	13.04	0.52	0.40	0.58	2.63
GST	0.77	3.67	0.52	1.32	1.24
Job	1.00	1.00	1.00	1.00	1.00
U/E	1.43	0.80	0.59	4.22	3.53
Other	5.42	0.96	0.60	1.56	4.95
Female			**age 18**		
	FTE	GST	Job	U/E	Other
age 16					
FTE	8.44	0.41	0.46	0.82	0.54
GST	0.44	2.27	0.86	2.05	0.60
Job	1.00	1.00	1.00	1.00	1.00
U/E	1.33	0.60	0.53	4.04	2.61
Other	4.22	0.36	0.44	1.75	2.71

Table 3.5

Transition matrices by GCSE attainment at year 11
(4 or fewer than 5 A*-C vs 5 or more A*-C)

YCS Cohort 8: Transition matrix by GCSE attainment at year 11

%			age 18	(1998)			
<5 A*-C	FTE	GST	Job	U/E	Other	Total	row share
age 16 (1996)							
FTE	40.95	8.87	38.95	7.13	4.10	100.0	53.27
GST	2.58	31.79	48.07	14.99	2.58	100.0	16.10
Job	2.68	13.27	69.48	8.58	5.99	100.0	16.49
U/E	9.46	6.12	40.20	28.60	15.63	100.0	8.27
Other	21.50	10.46	37.37	13.04	17.62	100.0	5.87
Total	24.72	13.15	45.46	10.76	5.92	100.0	

			age 18	(1998)			
5+ A*-C	FTE	GST	Job	U/E	Other	Total	row share
age 16 (1996)							
FTE	67.26	3.22	23.02	2.47	4.03	100.0	91.40
GST	6.23	35.11	54.73	2.27	1.65	100.0	2.51
Job	13.02	13.96	68.51	1.28	3.22	100.0	3.58
U/E	37.55	8.38	41.31	7.76	5.01	100.0	0.68
Other	48.53	7.51	28.48	2.43	13.05	100.0	1.83
Total	63.24	4.52	25.67	2.46	4.11	100.0	

YCS Cohort 9: Transition matrix by GCSE attainment at year 11

%			age 18	(2000)			
<5 A*-C	FTE	GST	Job	U/E	Other	Total	row share
age 16 (1998)							
FTE	42.21	9.45	37.50	6.98	3.86	100.0	50.88
GST	2.69	46.92	37.16	9.19	4.04	100.0	18.07
Job	2.38	10.99	74.03	6.61	6.00	100.0	19.03
U/E	3.25	9.61	30.73	34.42	22.00	100.0	8.36
Other	25.10	5.27	33.66	11.14	24.83	100.0	3.66
Total	23.60	16.38	43.68	9.75	6.58	100.0	

			age 18	(2000)			
5+ A*-C	FTE	GST	Job	U/E	Other	Total	row share
age 16 (1998)							
FTE	67.04	1.95	24.46	2.70	3.85	100.0	90.91
GST	7.52	42.22	45.84	3.69	0.73	100.0	3.66
Job	23.91	12.89	57.04	1.67	4.47	100.0	3.88
U/E	23.94	11.14	46.23	4.45	14.23	100.0	0.93
Other	60.90	10.07	10.57	6.49	11.98	100.0	0.62
Total	62.75	3.99	26.62	2.73	3.91	100.0	

Table 3.5 (continued)

Transition matrices by GCSE attainment at year 11
(4 or fewer than 5 A*-C vs 5 or more A*-C)

YCS Cohort 10: Transition matrix by GCSE attainment at year 11

%			age 18 (2002)				row
<5 A*-C	FTE	GST	Job	U/E	Other	Total	share
age 16 (2000)							
FTE	36.74	7.79	40.99	8.67	5.82	100.0	55.65
GST	2.53	29.28	51.36	11.18	5.66	100.0	16.76
Job	3.64	7.82	75.59	7.88	5.08	100.0	15.16
U/E	1.98	8.79	46.61	26.40	16.21	100.0	8.49
Other	15.77	2.70	45.55	12.51	23.47	100.0	3.93
Total	22.21	11.28	48.63	10.63	7.26	100.0	
			age 18	**(2002)**			row
5+ A*-C	FTE	GST	Job	U/E	Other	Total	share
age 16 (2000)							
FTE	62.57	2.49	24.60	2.09	8.25	100.0	91.29
GST	5.69	52.19	38.48	0.52	3.12	100.0	3.65
Job	18.35	5.17	65.04	4.45	7.00	100.0	3.63
U/E	23.46	4.24	45.72	16.95	9.63	100.0	0.85
Other	34.47	3.73	48.71	0.00	13.08	100.0	0.58
Total	58.40	4.42	26.89	2.23	8.05	100.0	

YCS Cohorts 8, 9 and 10 pooled: Transition matrix by GCSE attainment

%			age 18				row
<5 A*-C	FTE	GST	Job	U/E	Other	Total	share
age 16							
FTE	39.99	8.69	39.20	7.56	4.56	100.0	53.33
GST	2.60	35.37	45.91	12.23	3.89	100.0	16.82
Job	2.84	11.14	72.47	7.80	5.75	100.0	16.78
U/E	5.59	7.84	39.59	29.49	17.49	100.0	8.36
Other	20.84	7.50	38.60	12.52	20.53	100.0	4.72
Total	23.69	13.46	45.91	10.45	6.48	100.0	
			age 18				row
5+ A*-C	FTE	GST	Job	U/E	Other	Total	share
age 16							
FTE	65.69	2.65	23.92	2.41	5.34	100.0	91.23
GST	6.43	43.60	46.00	2.06	1.91	100.0	3.19
Job	17.79	10.86	64.16	2.40	4.78	100.0	3.67
U/E	28.51	7.84	44.34	9.85	9.46	100.0	0.80
Other	48.02	7.26	29.20	2.63	12.89	100.0	1.10
Total	61.55	4.34	26.32	2.46	5.33	100.0	

Table 3.6

Relative transition rates by GCSE attainment at year 11
(4 or fewer than 5 A*-C vs 5 or more A*-C)

YCS Cohort 8 Relative transition rates by GCSE attainment at year 11

<5 A*-C			**age 18**	**(1998)**	
	FTE	GST	Job	U/E	Other
age 16 (1996)					
FTE	15.28	0.67	0.56	0.83	0.68
GST	0.96	2.40	0.69	1.75	0.43
Job	1.00	1.00	1.00	1.00	1.00
U/E	3.53	0.46	0.58	3.33	2.61
Other	8.02	0.79	0.54	1.52	2.94

5+ A*-C			**age 18**	**(1998)**	
	FTE	GST	Job	U/E	Other
age 16 (1996)					
FTE	5.17	0.23	0.34	1.93	1.25
GST	0.48	2.52	0.80	1.77	0.51
Job	1.00	1.00	1.00	1.00	1.00
U/E	2.88	0.60	0.60	6.06	1.56
Other	3.73	0.54	0.42	1.90	4.05

YCS Cohort 9: Relative transition rates by GCSE attainment at year 11

<5 A*-C			**age 18**	**(2000)**	
	FTE	GST	Job	U/E	Other
age 16 (1998)					
FTE	17.74	0.86	0.51	1.06	0.64
GST	1.13	4.27	0.50	1.39	0.67
Job	1.00	1.00	1.00	1.00	1.00
U/E	1.37	0.87	0.42	5.21	3.67
Other	10.55	0.48	0.45	1.69	4.14

5+ A*-C			**age 18**	**(2000)**	
	FTE	GST	Job	U/E	Other
age 16 (1998)					
FTE	2.80	0.15	0.43	1.62	0.86
GST	0.31	3.28	0.80	2.21	0.16
Job	1.00	1.00	1.00	1.00	1.00
U/E	1.00	0.86	0.81	2.66	3.18
Other	2.55	0.78	0.19	3.89	2.68

Table 3.6 (continued)

Relative transition rates by GCSE attainment at year 11
(4 or fewer than 5 A*-C vs 5 or more A*-C)

YCS Cohort 10: Relative transition rates by GCSE attainment at year 11

<5 A*-C			**age 18**	**(2002)**	
	FTE	GST	Job	U/E	Other
age 16 (2000)					
FTE	10.09	1.00	0.54	1.10	1.15
GST	0.70	3.74	0.68	1.42	1.11
Job	1.00	1.00	1.00	1.00	1.00
U/E	0.54	1.12	0.62	3.35	3.19
Other	4.33	0.35	0.60	1.59	4.62

5+ A*-C			**age 18**	**(2002)**	
	FTE	GST	Job	U/E	Other
age 16 (2000)					
FTE	3.41	0.48	0.38	0.47	1.18
GST	0.31	10.09	0.59	0.12	0.45
Job	1.00	1.00	1.00	1.00	1.00
U/E	1.28	0.82	0.70	3.81	1.38
Other	1.88	0.72	0.75	0.00	1.87

YCS Cohorts 8, 9 and 10 pooled: Relative transition rates by GCSE attainment

<5 A*-C			**age 18**		
	FTE	GST	Job	U/E	Other
age 16					
FTE	14.08	0.78	0.54	0.97	0.79
GST	0.92	3.18	0.63	1.57	0.68
Job	1.00	1.00	1.00	1.00	1.00
U/E	1.97	0.70	0.55	3.78	3.04
Other	7.34	0.67	0.53	1.61	3.57

5+ A*-C			**age 18**		
	FTE	GST	Job	U/E	Other
age 16					
FTE	3.69	0.24	0.37	1.00	1.12
GST	0.36	4.01	0.72	0.86	0.40
Job	1.00	1.00	1.00	1.00	1.00
U/E	1.60	0.72	0.69	4.10	1.98
Other	2.70	0.67	0.46	1.10	2.70

Table 3.7

Transition matrices by parental education
(no parent with A-level or degree vs one or more parent with A-level or degree)

YCS Cohort 8: Transition matrix by parental education

% no FE	FTE	GST	age 18 Job	(1998) U/E	Other	Total	row share
age 16 (1996)							
FTE	50.51	6.90	33.46	5.22	3.90	100.0	64.50
GST	2.28	30.48	48.99	15.18	3.07	100.0	12.29
Job	3.52	13.27	70.90	6.08	6.23	100.0	12.78
U/E	8.21	7.10	38.98	28.96	16.75	100.0	5.95
Other	19.33	12.28	38.76	12.80	16.83	100.0	4.49
Total	34.67	10.86	40.72	8.31	5.44	100.0	

some FE	FTE	GST	age 18 Job	(1998) U/E	Other	Total	row share
age 16 (1996)							
FTE	64.91	3.59	23.99	3.22	4.29	100.0	81.46
GST	5.91	39.10	48.08	6.90	0.00	100.0	5.69
Job	6.73	13.76	63.72	12.58	3.20	100.0	6.77
U/E	23.30	2.88	45.45	20.60	7.76	100.0	2.82
Other	46.99	3.51	27.20	5.92	16.38	100.0	3.25
Total	55.86	6.28	28.76	4.64	4.47	100.0	

YCS Cohort 9: Transition matrix by parental education

% no FE	FTE	GST	age 18 Job	(2000) U/E	Other	Total	row share
age 16 (1998)							
FTE	51.81	6.41	33.44	5.04	3.30	100.0	63.01
GST	2.80	44.47	41.32	7.85	3.57	100.0	13.61
Job	3.17	12.43	72.89	5.92	5.60	100.0	14.88
U/E	3.65	10.62	32.87	32.45	20.41	100.0	5.83
Other	26.67	6.77	28.87	12.35	25.34	100.0	2.67
Total	34.42	12.74	40.23	7.35	5.26	100.0	

some FE	FTE	GST	age 18 Job	(2000) U/E	Other	Total	row share
age 16 (1998)							
FTE	65.64	2.58	23.74	3.37	4.68	100.0	82.38
GST	5.79	52.83	27.63	10.31	3.44	100.0	6.91
Job	17.09	5.97	64.81	5.56	6.57	100.0	6.24
U/E	10.47	6.51	29.34	29.06	24.62	100.0	3.05
Other	41.07	2.71	37.11	3.93	15.17	100.0	1.41
Total	56.44	6.39	26.93	4.77	5.47	100.0	

Table 3.7 (continued)

Transition matrices by parental education
(no parent with A-level or degree vs one or more parent with A-level or degree)

YCS Cohort 10: Transition matrix by parental education

%			age 18	(2002)			row
no FE	FTE	GST	Job	U/E	Other	Total	share
age 16 (2000)							
FTE	47.59	5.71	35.54	5.26	5.90	100.0	67.38
GST	2.71	31.91	48.26	11.10	6.01	100.0	12.05
Job	5.83	6.26	75.32	7.46	5.13	100.0	11.68
U/E	2.82	9.36	48.35	23.89	15.57	100.0	5.95
Other	17.91	2.87	46.66	10.68	21.88	100.0	2.94
Total	33.77	9.07	42.81	7.49	6.87	100.0	
			age 18	**(2002)**			row
some FE	FTE	GST	Job	U/E	Other	Total	share
age 16 (2000)							
FTE	59.69	2.86	24.36	3.75	9.33	100.0	83.35
GST	4.14	37.17	51.69	4.12	2.87	100.0	7.28
Job	8.43	11.27	67.28	6.42	6.60	100.0	5.64
U/E	8.12	4.44	39.10	32.45	15.90	100.0	2.60
Other	18.95	2.61	42.67	12.20	23.57	100.0	1.14
Total	50.96	5.87	29.36	4.77	9.04	100.0	

YCS Cohorts 8, 9 and 10 pooled: Transition matrix by parental education

%			age 18				row
no FE	FTE	GST	Job	U/E	Other	Total	share
age 16							
FTE	49.94	6.40	34.10	5.19	4.37	100.0	64.96
GST	2.56	34.97	46.54	11.87	4.06	100.0	12.57
Job	4.04	11.12	72.70	6.40	5.74	100.0	13.01
U/E	5.37	8.72	40.19	28.35	17.37	100.0	5.92
Other	20.47	8.81	38.73	12.18	19.82	100.0	3.53
Total	34.33	10.83	41.22	7.80	5.82	100.0	
			age 18				row
some FE/HE	FTE	GST	Job	U/E	Other	Total	share
age 16							
FTE	63.43	3.09	24.04	3.43	6.01	100.0	82.30
GST	5.25	42.23	43.68	6.87	1.97	100.0	6.51
Job	9.91	11.02	65.02	9.00	5.04	100.0	6.27
U/E	15.23	4.36	39.03	26.46	14.91	100.0	2.81
Other	41.16	3.21	31.59	6.65	17.39	100.0	2.10
Total	54.46	6.18	28.47	4.72	6.17	100.0	

Table 3.8

Relative transition rates by parental education
(no parent with A-level or degree vs one or more parent with A-level or degree)

YCS Cohort 8: Relative transition rates by parental education

no FE			**age 18**	**(1998)**	
	FTE	GST	Job	U/E	Other
age 16 (1996)					
FTE	14.35	0.52	0.47	0.86	0.63
GST	0.65	2.30	0.69	2.50	0.49
Job	1.00	1.00	1.00	1.00	1.00
U/E	2.33	0.54	0.55	4.76	2.69
Other	5.49	0.93	0.55	2.11	2.70
some FE			**age 18**	**(1998)**	
	FTE	GST	Job	U/E	Other
age 16 (1996)					
FTE	9.64	0.26	0.38	0.26	1.34
GST	0.88	2.84	0.75	0.55	0.00
Job	1.00	1.00	1.00	1.00	1.00
U/E	3.46	0.21	0.71	1.64	2.43
Other	6.98	0.26	0.43	0.47	5.12

YCS Cohort 9: Relative transition rates by parental education

no FE			**age 18**	**(2000)**	
	FTE	GST	Job	U/E	Other
age 16 (1998)					
FTE	16.34	0.52	0.46	0.85	0.59
GST	0.88	3.58	0.57	1.33	0.64
Job	1.00	1.00	1.00	1.00	1.00
U/E	1.15	0.85	0.45	5.48	3.64
Other	8.41	0.54	0.40	2.09	4.53
some FE			**age 18**	**(2000)**	
	FTE	GST	Job	U/E	Other
age 16 (1998)					
FTE	3.84	0.43	0.37	0.61	0.71
GST	0.34	8.85	0.43	1.85	0.52
Job	1.00	1.00	1.00	1.00	1.00
U/E	0.61	1.09	0.45	5.23	3.75
Other	2.40	0.45	0.57	0.71	2.31

Table 3.8 (continued)

Relative transition rates by parental education
(no parent with A-level or degree vs one or more parent with A-level or degree)

YCS Cohort 10: Relative transition rates by parental education

no FE			**age 18**	**(2002)**	
	FTE	GST	Job	U/E	Other
age 16 (2000)					
FTE	8.16	0.91	0.47	0.71	1.15
GST	0.46	5.10	0.64	1.49	1.17
Job	1.00	1.00	1.00	1.00	1.00
U/E	0.48	1.50	0.64	3.20	3.04
Other	3.07	0.46	0.62	1.43	4.27
some FE			**age 18**	**(2002)**	
	FTE	GST	Job	U/E	Other
age 16 (2000)					
FTE	7.08	0.25	0.36	0.58	1.41
GST	0.49	3.30	0.77	0.64	0.43
Job	1.00	1.00	1.00	1.00	1.00
U/E	0.96	0.39	0.58	5.05	2.41
Other	2.25	0.23	0.63	1.90	3.57

YCS Cohorts 8, 9 and 10 pooled: Relative transition rates by parental education

no FE			**age 18**		
	FTE	GST	Job	U/E	Other
age 16					
FTE	12.36	0.58	0.47	0.81	0.76
GST	0.63	3.14	0.64	1.85	0.71
Job	1.00	1.00	1.00	1.00	1.00
U/E	1.33	0.78	0.55	4.43	3.03
Other	5.07	0.79	0.53	1.90	3.45
some FE			**age 18**		
	FTE	GST	Job	U/E	Other
age 16					
FTE	6.40	0.28	0.37	0.38	1.19
GST	0.53	3.83	0.67	0.76	0.39
Job	1.00	1.00	1.00	1.00	1.00
U/E	1.54	0.40	0.60	2.94	2.96
Other	4.15	0.29	0.49	0.74	3.45

Table 3.9

Transition matrices by socio-economic group (SEG)
(SEG classes 1 and 2 (non-manual) *vs* SEG classes 3, 4 and 5 (manual))

YCS Cohort 8: Transition matrix by socio-economic group

%			age 18	(1998)			row
SEG non-man	FTE	GST	Job	U/E	Other	Total	share
age 16 (1996)							
FTE	63.52	4.08	25.06	3.06	4.27	100.0	81.75
GST	3.69	36.18	46.82	11.69	1.62	100.0	5.83
Job	5.95	10.88	71.42	6.27	5.48	100.0	7.24
U/E	18.39	10.08	37.07	22.04	12.41	100.0	2.45
Other	41.66	6.79	36.46	2.23	12.86	100.0	2.73
Total	54.16	6.67	30.29	4.24	4.64	100.0	

			age 18	(1998)			row
SEG manual	FTE	GST	Job	U/E	Other	Total	share
age 16 (1996)							
FTE	48.23	7.24	35.67	5.43	3.43	100.0	62.10
GST	3.44	31.49	50.43	12.89	1.75	100.0	13.57
Job	3.88	14.53	69.96	6.22	5.41	100.0	14.15
U/E	8.60	6.81	42.25	29.06	13.29	100.0	5.91
Other	21.83	12.08	34.09	10.81	21.18	100.0	4.28
Total	32.40	11.74	42.85	8.18	4.83	100.0	

YCS Cohort 9: Transition matrix by socio-economic group

%			age 18	(2000)			row
SEG non-man	FTE	GST	Job	U/E	Other	Total	share
age 16 (1998)							
FTE	63.32	3.79	25.19	3.52	4.18	100.0	83.64
GST	5.52	44.60	38.71	6.72	4.45	100.0	7.05
Job	13.01	5.47	66.98	7.16	7.38	100.0	6.08
U/E	9.85	0.00	45.67	24.50	19.99	100.0	2.22
Other	38.93	7.13	21.11	12.53	20.30	100.0	1.01
Total	54.75	6.71	29.10	4.52	4.91	100.0	

			age 18	(2000)			row
SEG manual	FTE	GST	Job	U/E	Other	Total	share
age 16 (1998)							
FTE	50.06	5.55	35.94	5.04	3.42	100.0	59.22
GST	3.08	46.46	39.48	8.67	2.31	100.0	15.01
Job	4.26	12.86	73.36	4.63	4.88	100.0	16.63
U/E	4.02	9.38	33.62	34.50	18.48	100.0	6.09
Other	33.61	6.81	37.14	7.19	15.25	100.0	3.05
Total	32.08	13.18	42.59	7.37	4.77	100.0	

Table 3.9 (continued)

Transition matrices by socio-economic group (SEG)
(SEG classes 1 and 2 (non-manual) *vs* SEG classes 3, 4 and 5 (manual))

YCS Cohort 10: Transition matrix by socio-economic group

%			age 18 (2002)				row
SEG non-man	FTE	GST	Job	U/E	Other	Total	share
age 16 (2000)							
FTE	58.73	2.95	27.21	3.39	7.72	100.0	82.50
GST	2.66	33.44	49.40	7.82	6.68	100.0	6.36
Job	7.46	11.43	69.65	4.53	6.94	100.0	6.66
U/E	3.75	6.45	55.74	23.67	10.39	100.0	2.80
Other	10.50	0.00	50.70	30.06	8.74	100.0	1.68
Total	49.40	5.50	32.64	4.76	7.69	100.0	
			age 18	**(2002)**			row
SEG manual	FTE	GST	Job	U/E	Other	Total	share
age 16 (2000)							
FTE	47.97	5.67	34.34	5.37	6.65	100.0	66.83
GST	2.99	34.22	49.26	8.98	4.55	100.0	13.53
Job	5.29	5.97	75.52	7.73	5.49	100.0	11.91
U/E	4.49	8.88	55.09	15.01	16.52	100.0	5.40
Other	16.95	5.66	44.82	0.00	32.57	100.0	2.33
Total	33.73	9.74	42.63	6.53	7.36	100.0	

YCS Cohorts 8, 9 and 10 pooled: Transition matrix by socio-economic group

%			age 18				row
SEG non-man	FTE	GST	Job	U/E	Other	Total	share
age 16							
FTE	62.05	3.67	25.73	3.28	5.27	100.0	82.47
GST	3.93	37.86	45.18	9.06	3.97	100.0	6.31
Job	8.08	9.74	69.84	5.98	6.36	100.0	6.76
U/E	11.50	6.48	45.32	23.16	13.54	100.0	2.49
Other	33.38	5.11	37.97	10.70	12.83	100.0	1.96
Total	52.91	6.34	30.67	4.47	5.61	100.0	
			age 18				row
SEG manual	FTE	GST	Job	U/E	Other	Total	share
age 16							
FTE	48.62	6.27	35.29	5.31	4.52	100.0	62.80
GST	3.19	36.80	46.80	10.43	2.78	100.0	13.96
Job	4.38	11.69	72.56	6.11	5.26	100.0	14.12
U/E	6.04	8.17	43.53	26.49	15.76	100.0	5.80
Other	23.75	9.30	37.27	7.47	22.21	100.0	3.32
Total	32.74	11.51	42.71	7.43	5.62	100.0	

Table 3.10

Relative transition rates by socio-economic group (SEG)
(SEG classes 1 and 2 (non-manual) *vs* SEG classes 3, 4 and 5 (manual))

YCS Cohort 8: Relative transition rates by socio-economic group

SEG non-man			**age 18**	**(1998)**	
	FTE	GST	Job	U/E	Other
age 16 (1996)					
FTE	10.68	0.38	0.35	0.49	0.78
GST	0.62	3.33	0.66	1.86	0.30
Job	1.00	1.00	1.00	1.00	1.00
U/E	3.09	0.93	0.52	3.52	2.26
Other	7.00	0.62	0.51	0.36	2.35
SEG manual			**age 18**	**(1998)**	
	FTE	GST	Job	U/E	Other
age 16 (1996)					
FTE	12.43	0.50	0.51	0.87	0.63
GST	0.89	2.17	0.72	2.07	0.32
Job	1.00	1.00	1.00	1.00	1.00
U/E	2.22	0.47	0.60	4.67	2.46
Other	5.63	0.83	0.49	1.74	3.91

YCS Cohort 9: Relative transition rates by socio-economic group

SEG non-man			**age 18**	**(2000)**	
	FTE	GST	Job	U/E	Other
age 16 (1998)					
FTE	4.87	0.69	0.38	0.49	0.57
GST	0.42	8.15	0.58	0.94	0.60
Job	1.00	1.00	1.00	1.00	1.00
U/E	0.76	0.00	0.68	3.42	2.71
Other	2.99	1.30	0.32	1.75	2.75
SEG manual			**age 18**	**(2000)**	
	FTE	GST	Job	U/E	Other
age 16 (1998)					
FTE	11.75	0.43	0.49	1.09	0.70
GST	0.72	3.61	0.54	1.87	0.47
Job	1.00	1.00	1.00	1.00	1.00
U/E	0.94	0.73	0.46	7.45	3.79
Other	7.89	0.53	0.51	1.55	3.13

Table 3.10 (continued)

Relative transition rates by socio-economic group (SEG)
(SEG classes 1 and 2 (non-manual) *vs* SEG classes 3, 4 and 5 (manual))

YCS Cohort 10: Relative transition rates by socio-economic group

SEG non-man			**age 18**	**(2002)**	
	FTE	GST	Job	U/E	Other
age 16 (2000)					
FTE	7.87	0.26	0.39	0.75	1.11
GST	0.36	2.93	0.71	1.73	0.96
Job	1.00	1.00	1.00	1.00	1.00
U/E	0.50	0.56	0.80	5.23	1.50
Other	1.41	0.00	0.73	6.64	1.26
SEG manual			**age 18**	**(2002)**	
	FTE	GST	Job	U/E	Other
age 16 (2000)					
FTE	9.07	0.95	0.45	0.69	1.21
GST	0.57	5.73	0.65	1.16	0.83
Job	1.00	1.00	1.00	1.00	1.00
U/E	0.85	1.49	0.73	1.94	3.01
Other	3.20	0.95	0.59	0.00	5.93

YCS Cohorts 8, 9 and 10 pooled: Relative transition rates by socio-economic group

SEG non-man			**age 18**		
	FTE	GST	Job	U/E	Other
age 16					
FTE	7.68	0.38	0.37	0.55	0.83
GST	0.49	3.89	0.65	1.52	0.62
Job	1.00	1.00	1.00	1.00	1.00
U/E	1.42	0.67	0.65	3.87	2.13
Other	4.13	0.52	0.54	1.79	2.02
SEG manual			**age 18**		
	FTE	GST	Job	U/E	Other
age 16					
FTE	11.10	0.54	0.49	0.87	0.86
GST	0.73	3.15	0.64	1.71	0.53
Job	1.00	1.00	1.00	1.00	1.00
U/E	1.38	0.70	0.60	4.34	3.00
Other	5.42	0.80	0.51	1.22	4.22

Table 3.11

Transition matrices by hourly pay for those in employment or GST (below median hourly pay vs above median hourly pay)

YCS Cohort 8: Transition matrix by hourly pay

% < median pay	FTE	GST	age 18 (1998) Job	U/E	Other	Total	row share
age 16 (1996)							
GST	2.81	29.98	52.96	12.57	1.68	100.0	82.75
Job	2.43	21.87	58.13	14.00	3.58	100.0	17.25
Total	2.75	28.58	53.85	12.81	2.01	100.0	
> median pay	FTE	GST	age 18 (1998) Job	U/E	Other	Total	row share
age 16 (1996)							
GST	4.18	48.69	38.05	7.60	1.47	100.0	18.92
Job	4.96	12.61	69.85	7.13	5.45	100.0	81.08
Total	4.81	19.44	63.83	7.22	4.70	100.0	

YCS Cohort 9: Transition matrix by hourly pay

% < median pay	FTE	GST	age 18 (2000) Job	U/E	Other	Total	row share
age 16 (1998)							
GST	3.12	43.74	39.92	9.82	3.41	100.0	76.18
Job	6.83	18.88	65.85	7.24	1.19	100.0	23.82
Total	4.00	37.82	46.10	9.20	2.88	100.0	
> median pay	FTE	GST	age 18 (2000) Job	U/E	Other	Total	row share
age 16 (1998)							
GST	4.93	55.69	36.78	1.07	1.53	100.0	18.78
Job	5.92	7.91	75.71	3.19	7.26	100.0	81.22
Total	5.74	16.89	68.40	2.79	6.18	100.0	

Table 3.11 (continued)

Transition matrices by hourly pay for those in employment or GST (below median hourly pay vs above median hourly pay)

YCS Cohort 10: Transition matrix by hourly pay

% < median pay	FTE	GST	age 18 (2002) Job	U/E	Other	Total	row share
age 16 (2000)							
GST	2.49	36.03	49.35	7.10	5.03	100.0	67.83
Job	7.16	9.36	75.53	3.45	4.51	100.0	32.17
Total	3.99	27.45	57.77	5.92	4.86	100.0	
> median pay	FTE	GST	age 18 (2002) Job	U/E	Other	Total	row share
age 16 (2000)							
GST	4.21	37.44	44.67	8.13	5.55	100.0	20.09
Job	8.40	6.74	71.04	7.93	5.89	100.0	79.91
Total	7.56	12.91	65.74	7.97	5.82	100.0	

YCS Cohorts 8, 9 and 10 pooled: Transition matrix by hourly pay

% < median pay	FTE	GST	age 18 Job	U/E	Other	Total	row share
age 16							
GST	2.82	35.78	48.03	10.26	3.11	100.0	76.25
Job	5.70	15.84	67.60	7.62	3.23	100.0	23.75
Total	3.50	31.04	52.68	9.64	3.13	100.0	
> median pay	FTE	GST	age 18 Job	U/E	Other	Total	row share
age 16							
GST	4.43	48.51	39.07	5.62	2.37	100.0	19.12
Job	5.97	9.89	72.01	6.00	6.13	100.0	80.88
Total	5.68	17.27	65.71	5.93	5.41	100.0	

Table 3.12

Detailed transition matrices

YCS Cohort 8: Transition matrix

%	age 18 (1998)								
by FTE type	FTE degree	FTE other	GST	Job	U/E	Other	Total	row share	weighted obs
age 16 (1996)									
FTE acad only	51.59	18.92	2.54	20.46	2.44	4.04	100.0	34.36	3,481
FTE voc only	5.25	32.46	9.51	42.05	6.80	3.93	100.0	26.93	2,728
FTE mixed	20.32	36.89	5.45	27.97	4.85	4.51	100.0	9.04	915
GST	0.12	2.87	32.16	48.81	13.57	2.47	100.0	10.02	1,015
Job	0.66	3.56	13.37	69.34	7.49	5.58	100.0	10.71	1,085
U/E	0.13	11.08	6.26	40.27	27.29	14.96	100.0	4.88	494
Other	5.69	21.25	9.87	35.58	10.91	16.70	100.0	4.06	412
Total	21.30	20.65	9.29	36.61	7.05	5.11	100.0	100.0	10,130

%	age 18 (1998)								
by FTE working	FTE degree	FTE other	GST	Job	U/E	Other	Total	row share	weighted obs
age 16 (1996)									
FTE and working	31.08	22.93	5.68	34.27	3.04	3.00	100.0	23.94	2,426
FTE not working	29.19	28.22	5.53	27.32	5.13	4.61	100.0	46.39	4,699
GST	0.12	2.87	32.16	48.81	13.57	2.47	100.0	10.02	1,015
Job	0.66	3.56	13.37	69.34	7.49	5.58	100.0	10.71	1,085
U/E	0.13	11.08	6.26	40.27	27.29	14.96	100.0	4.88	494
Other	5.69	21.25	9.87	35.58	10.91	16.70	100.0	4.06	412
Total	21.30	20.65	9.29	36.61	7.05	5.11	100.0	100.0	10,130

Table 3.12 (continued)

Detailed transition matrices

YCS Cohort 9: Transition matrix

%				age 18 (2000)					
by FTE type	FTE degree	FTE other	GST	Job	U/E	Other	Total	row share	weighted obs
age 16 (1998)									
FTE acad only	51.10	18.60	1.49	21.94	2.43	4.43	100.0	35.34	2,228
FTE voc only	5.30	35.08	8.84	40.41	6.78	3.58	100.0	26.00	1,639
FTE mixed	23.10	35.11	6.80	27.72	4.98	2.28	100.0	8.28	522
GST	0.41	3.01	46.21	38.47	8.36	3.54	100.0	11.33	714
Job	0.23	5.42	11.28	71.45	5.86	5.77	100.0	11.94	753
U/E	0.64	4.46	9.75	32.12	31.73	21.30	100.0	4.88	308
Other	4.48	25.29	5.89	30.65	10.54	23.15	100.0	2.24	141
Total	21.55	20.37	10.58	35.70	6.47	5.33	100.0	100.0	6,304

%				age 18 (2000)					
by FTE working	FTE degree	FTE other	GST	Job	U/E	Other	Total	row share	weighted obs
age 16 (1998)									
FTE and working	31.95	24.29	5.17	33.13	2.34	3.12	100.0	30.67	1,933
FTE not working	29.66	28.63	4.63	26.69	5.96	4.43	100.0	38.95	2,455
GST	0.41	3.01	46.21	38.47	8.36	3.54	100.0	11.33	714
Job	0.23	5.42	11.28	71.45	5.86	5.77	100.0	11.94	753
U/E	0.64	4.46	9.75	32.12	31.73	21.30	100.0	4.88	308
Other	4.48	25.29	5.89	30.65	10.54	23.15	100.0	2.24	141
Total	21.55	20.37	10.58	35.70	6.47	5.33	100.0	100.0	6,304

Table 3.12 (continued)

Detailed transition matrices

YCS Cohort 10: Transition matrix

%	age 18 (2002)								
by FTE type	FTE degree	FTE other	GST	Job	U/E	Other	Total	row share	weighted obs
age 16 (2000)									
FTE acad only	49.68	17.10	2.14	20.48	2.23	8.38	100.0	34.89	2,526
FTE voc only	5.76	29.46	8.08	43.82	7.33	5.55	100.0	28.01	2,027
FTE mixed	23.68	27.73	3.07	31.54	5.54	8.44	100.0	10.21	739
GST	0.37	2.71	33.24	49.13	9.34	5.22	100.0	10.34	748
Job	0.11	6.27	7.32	73.61	7.24	5.44	100.0	9.51	689
U/E	0.23	3.63	8.39	46.53	25.58	15.64	100.0	4.75	344
Other	2.39	15.70	2.83	45.95	10.95	22.18	100.0	2.29	166
Total	21.48	18.46	7.92	37.98	6.52	7.65	100.0	100.0	7,238

%	age 18 (2002)								
by FTE working	FTE degree	FTE other	GST	Job	U/E	Other	Total	row share	weighted obs
age 16 (2000)									
FTE and working	30.47	20.76	4.25	35.08	2.76	6.68	100.0	30.72	2,223
FTE not working	28.32	25.18	4.76	27.98	6.01	7.75	100.0	42.39	3,069
GST	0.37	2.71	33.24	49.13	9.34	5.22	100.0	10.34	748
Job	0.11	6.27	7.32	73.61	7.24	5.44	100.0	9.51	689
U/E	0.23	3.63	8.39	46.53	25.58	15.64	100.0	4.75	344
Other	2.39	15.70	2.83	45.95	10.95	22.18	100.0	2.29	166
Total	21.48	18.46	7.92	37.98	6.52	7.65	100.0	100.0	7,238

Table 3.12 (continued)

Detailed transition matrices

YCS Cohorts 8, 9 and 10 pooled: Transition matrix

%	age 18								
by FTE type	FTE degree	FTE other	GST	Job	U/E	Other	Total	row share	weighted obs
age 16									
FTE acad only	50.87	18.28	2.13	20.87	2.37	5.48	100.0	34.79	8,234
FTE voc only	5.42	32.18	8.88	42.19	6.97	4.35	100.0	27.01	6,394
FTE mixed	22.13	33.35	4.96	29.12	5.12	5.31	100.0	9.19	2,176
GST	0.28	2.86	36.54	45.92	10.79	3.61	100.0	10.47	2,478
Job	0.38	4.86	11.10	71.13	6.93	5.60	100.0	10.67	2,526
U/E	0.30	7.06	7.84	39.96	27.97	16.87	100.0	4.84	1,145
Other	4.69	20.76	7.46	37.01	10.84	19.24	100.0	3.03	718
Total	21.42	19.91	9.21	36.79	6.73	5.94	100.0	100.0	23,672

%	age 18								
by FTE working	FTE degree	FTE other	GST	Job	U/E	Other	Total	row share	weighted obs
age 16									
FTE and working	31.13	22.59	5.05	34.21	2.74	4.28	100.0	27.81	6,583
FTE not working	29.04	27.40	5.08	27.37	5.60	5.51	100.0	43.18	10,222
GST	0.28	2.86	36.54	45.92	10.79	3.61	100.0	10.47	2,478
Job	0.38	4.86	11.10	71.13	6.93	5.60	100.0	10.67	2,526
U/E	0.30	7.06	7.84	39.96	27.97	16.87	100.0	4.84	1,145
Other	4.69	20.76	7.46	37.01	10.84	19.24	100.0	3.03	718
Total	21.42	19.91	9.21	36.79	6.73	5.94	100.0	100.0	23,672

Table 3.13

Relative transition rates – detailed transition matrices

YCS Cohort 8: Relative transition rates

	age 18 (1998)					
	FTE degree	FTE other	GST	Job	U/E	Other
age 16 (1996)						
FTE acad only	78.17	5.31	0.19	0.30	0.33	0.72
FTE voc only	7.95	9.12	0.71	0.61	0.91	0.70
FTE mixed	30.79	10.36	0.41	0.40	0.65	0.81
FTE and working	47.09	6.44	0.42	0.49	0.41	0.54
FTE not working	44.23	7.93	0.41	0.39	0.68	0.83
GST	0.18	0.81	2.41	0.70	1.81	0.44
Job	1.00	1.00	1.00	1.00	1.00	1.00
U/E	0.20	3.11	0.47	0.58	3.64	2.68
Other	8.62	5.97	0.74	0.51	1.46	2.99

YCS Cohort 9: Relative transition rates

	age 18 (2000)					
	FTE degree	FTE other	GST	Job	U/E	Other
age 16 (1998)						
FTE acad only	222.17	3.43	0.13	0.31	0.41	0.77
FTE voc only	23.04	6.47	0.78	0.57	1.16	0.62
FTE mixed	100.43	6.48	0.60	0.39	0.85	0.40
FTE and working	138.91	4.48	0.46	0.46	0.40	0.54
FTE not working	128.96	5.28	0.41	0.37	1.02	0.77
GST	1.78	0.56	4.10	0.54	1.43	0.61
Job	1.00	1.00	1.00	1.00	1.00	1.00
U/E	2.78	0.82	0.86	0.45	5.41	3.69
Other	19.48	4.67	0.52	0.43	1.80	4.01

Table 3.13 (continued)

Relative transition rates – detailed transition matrices

YCS Cohort 10: Relative transition rates

	age 18 (2002)					
	FTE degree	FTE other	GST	Job	U/E	Other
age 16 (2000)						
FTE acad only	451.64	2.73	0.29	0.28	0.31	1.54
FTE voc only	52.36	4.70	1.10	0.60	1.01	1.02
FTE mixed	215.27	4.42	0.42	0.43	0.77	1.55
FTE and working	277.00	3.31	0.58	0.48	0.38	1.23
FTE not working	257.45	4.02	0.65	0.38	0.83	1.42
GST	3.36	0.43	4.54	0.67	1.29	0.96
Job	1.00	1.00	1.00	1.00	1.00	1.00
U/E	2.09	0.58	1.15	0.63	3.53	2.88
Other	21.73	2.50	0.39	0.62	1.51	4.08

YCS Cohorts 8, 9 and 10 pooled: Relative transition rates

	age 18					
	FTE degree	FTE other	GST	Job	U/E	Other
age 16						
FTE acad only	133.87	3.76	0.19	0.29	0.34	0.98
FTE voc only	14.26	6.62	0.80	0.59	1.01	0.78
FTE mixed	58.24	6.86	0.45	0.41	0.74	0.95
FTE and working	81.92	4.65	0.45	0.48	0.40	0.76
FTE not working	76.42	5.64	0.46	0.38	0.81	0.98
GST	0.74	0.59	3.29	0.65	1.56	0.64
Job	1.00	1.00	1.00	1.00	1.00	1.00
U/E	0.79	1.45	0.71	0.56	4.04	3.01
Other	12.34	4.27	0.67	0.52	1.56	3.44

Table 4.1

Multinomial logit specification for activities at age 16: YCS Cohort 11, sweep 1
(base category – Full-time education)

	GST	Job	U/E	Other
male	0.505 (0.065)***	0.181 (0.056)***	-0.105 (0.079)	0.252 (0.140)*
age 16 at January 2002	-0.126 (0.069)*	-0.294 (0.059)***	-0.251 (0.082)***	-0.420 (0.144)***
ethnicity - black	-1.715 (0.368)***	-2.005 (0.351)***	-0.635 (0.238)***	-0.290 (0.430)
ethnicity - Asian	-1.251 (0.174)***	-1.429 (0.164)***	-0.355 (0.160)**	-0.487 (0.322)
ethnicity - mixed/other	-0.172 (0.202)	-0.626 (0.201)***	-0.363 (0.243)	0.244 (0.362)
disability/health problem	-0.306 (0.174)*	-0.190 (0.149)	-0.041 (0.180)	0.828 (0.236)***
qualifications: 8+ GCSEs at A*-C	-2.720 (0.170)***	-2.885 (0.134)***	-3.774 (0.168)***	-3.017 (0.253)***
qualifications: 5-7 GCSEs at A*-C	-1.319 (0.161)***	-1.586 (0.131)***	-2.533 (0.155)***	-2.478 (0.275)***
qualifications: 1-4 GCSEs at A*-C	-0.475 (0.151)***	-0.890 (0.123)***	-1.590 (0.129)***	-1.564 (0.225)***
qualifications: 5+ GCSEs at D-G	-0.173 (0.163)	-0.597 (0.135)***	-1.091 (0.144)***	-1.020 (0.251)***
qualifications: 1-4 GCSEs at D-G	0.083 (0.263)	-0.029 (0.216)	-0.348 (0.230)	-0.519 (0.421)
independent school at year 11	-1.252 (0.325)***	-0.920 (0.225)***	-1.442 (0.464)***	-0.526 (0.456)
parents home owner	-0.092 (0.082)	-0.261 (0.071)***	-0.667 (0.092)***	-0.730 (0.167)***
living with both parents	0.043 (0.077)	-0.045 (0.066)	-0.464 (0.085)***	-0.105 (0.158)
at least 1 parent with a degree	-0.408 (0.102)***	-0.185 (0.085)**	-0.087 (0.116)	-0.148 (0.213)
at least 1 parent with A-levels	-0.046 (0.087)	-0.082 (0.075)	-0.147 (0.114)	0.339 (0.173)**
living in workless household	-0.346 (0.172)**	-0.209 (0.154)	-0.082 (0.160)	-0.060 (0.348)
SEC2	0.150 (0.130)	0.205 (0.112)*	0.411 (0.193)**	0.955 (0.341)***
SEC3	0.434 (0.133)***	0.561 (0.116)***	0.584 (0.195)***	1.104 (0.344)***
SEC4	0.506 (0.147)***	0.777 (0.126)***	0.646 (0.209)***	0.824 (0.392)**
SEC5	0.491 (0.145)***	0.524 (0.129)***	0.753 (0.200)***	0.728 (0.377)*
SEC6	0.493 (0.150)***	0.373 (0.138)***	0.765 (0.208)***	0.494 (0.399)
constant	-1.264 (0.205)***	-0.212 (0.174)	0.025 (0.234)	-2.048 (0.405)***
Observations	1,169 (7.0%)	1,675 (10.0%)	811 (4.8%)	216 (1.3%)

Notes to Table 4.1:

1. Variable definitions, means and standard deviations are reported in Appendix B.
2. Heteroskedastic-consistent standard errors are given in parentheses; ***, **, * denotes statistically significantly different from zero at 10%, 5% and 1% respectively.
3. Base category: FTE: observations 12,836 (76.8%); total observations: 16,707.
4. Diagnostics: Wald $\chi^2(92) = 3{,}434.0$; Pseudo $R^2 = 0.1608$.
5. Comparison groups are: female; age 17 at January 2002; ethnicity – white; no disability/health problems; no qualifications at end year 11; LEA, CTC or other school at year 11; council or private rented; living with only one or neither parent; neither parent with A-levels or degree; at least one parent working; SEC1: higher professional; regressions also include dummy for ethnicity - missing.

Table 4.2

Relative risk ratios for activities at age 16: YCS Cohort 11, sweep 1 (base category – Full-time education)

	Relative risk ratios (*RRR*s):			
	GST	Job	U/E	Other
male	1.66	1.20	0.90	1.29
age 16 at January 2002	0.88	0.75	0.78	0.66
ethnicity - black	0.18	0.13	0.53	0.75
ethnicity - Asian	0.29	0.24	0.70	0.61
ethnicity - mixed/other	0.84	0.53	0.70	1.28
disability/health problem	0.74	0.83	0.96	2.29
qualifications: 8+ GCSEs at A*-C	0.07	0.06	0.02	0.05
qualifications: 5-7 GCSEs at A*-C	0.27	0.20	0.08	0.08
qualifications: 1-4 GCSEs at A*-C	0.62	0.41	0.20	0.21
qualifications: 5+ GCSEs at D-G	0.84	0.55	0.34	0.36
qualifications: 1-4 GCSEs at D-G	1.09	0.97	0.71	0.59
independent school at year 11	0.29	0.40	0.24	0.59
parents home owner	0.91	0.77	0.51	0.48
living with both parents	1.04	0.96	0.63	0.90
at least 1 parent with a degree	0.67	0.83	0.92	0.86
at least 1 parent with A-levels	0.96	0.92	0.86	1.40
living in workless household	0.71	0.81	0.92	0.94
SEC2	1.16	1.23	1.51	2.60
SEC3	1.54	1.75	1.79	3.02
SEC4	1.66	2.17	1.91	2.28
SEC5	1.63	1.69	2.12	2.07
SEC6	1.64	1.45	2.15	1.64

Table 4.3

Marginal effects for activities at age 16: YCS Cohort 11, sweep 1

	Marginal effects:				
	FTE	GST	Job	U/E	Other
male	-0.032	0.023	0.011	-0.004	0.002
age 16 at January 2002	0.033	-0.004	-0.020	-0.006	-0.004
ethnicity - black	0.115	-0.038	-0.064	-0.010	-0.001
ethnicity - Asian	0.102	-0.034	-0.059	-0.006	-0.003
ethnicity - mixed/other	0.042	-0.005	-0.033	-0.007	0.003
disability/health problem	0.012	-0.012	-0.012	-0.001	0.012
qualifications: 8+ GCSEs at A*-C	0.407	-0.103	-0.178	-0.102	-0.025
qualifications: 5-7 GCSEs at A*-C	0.153	-0.038	-0.069	-0.034	-0.012
qualifications: 1-4 GCSEs at A*-C	0.099	-0.015	-0.046	-0.027	-0.010
qualifications: 5+ GCSEs at D-G	0.060	-0.005	-0.031	-0.018	-0.006
qualifications: 1-4 GCSEs at D-G	0.008	0.005	-0.001	-0.007	-0.004
independent school at year 11	0.101	-0.034	-0.043	-0.021	-0.003
parents home owner	0.045	-0.002	-0.016	-0.019	-0.008
living with both parents	0.013	0.003	-0.002	-0.013	-0.001
at least 1 parent with a degree	0.029	-0.016	-0.011	-0.001	-0.001
at least 1 parent with A-levels	0.007	-0.002	-0.005	-0.003	0.004
living in workless household	0.026	-0.013	-0.012	-0.001	0.000
SEC2	-0.038	0.005	0.012	0.010	0.011
SEC3	-0.084	0.017	0.039	0.014	0.013
SEC4	-0.107	0.020	0.062	0.016	0.009
SEC5	-0.086	0.021	0.036	0.022	0.008
SEC6	-0.072	0.022	0.023	0.023	0.004
sample proportions	0.786	0.070	0.100	0.048	0.013

Table 4.4

Wage determination at age 16: YCS Cohort 11, sweep 1

	Column (1) OLS wage equation		Column (2) Heckman selection model			
Dependent variable:	log hourly pay		log hourly pay		in employment	
male	0.130	(0.019)***	0.141	(0.019)***	0.156	(0.027)***
age 16 at January 2002	-0.023	(0.019)	-0.031	(0.020)	-0.105	(0.029)***
ethnicity - black	-0.022	(0.139)	-0.095	(0.142)	-0.932	(0.142)***
ethnicity - Asian	-0.012	(0.061)	-0.065	(0.069)	-0.715	(0.072)***
ethnicity - mixed/other	0.088	(0.075)	0.068	(0.076)	-0.253	(0.091)***
disability/health problem	0.058	(0.052)	0.045	(0.053)	-0.178	(0.075)**
qualifications: 8+ GCSEs at A*-C	0.156	(0.044)***	0.078	(0.060)	-1.072	(0.069)***
qualifications: 5-7 GCSEs at A*-C	0.077	(0.043)*	0.048	(0.047)	-0.432	(0.069)***
qualifications: 1-4 GCSEs at A*-C	0.015	(0.041)	0.013	(0.042)	-0.033	(0.066)
qualifications: 5+ GCSEs at D-G	-0.020	(0.044)	-0.016	(0.044)	0.054	(0.072)
qualifications: 1-4 GCSEs at D-G	-0.095	(0.068)	-0.090	(0.068)	0.057	(0.118)
independent school at year 11	0.006	(0.074)	-0.032	(0.077)	-0.430	(0.090)***
GST	-0.485	(0.019)***	-0.485	(0.019)***		
parents home owner					-0.034	(0.036)
living with both parents					0.059	(0.034)*
at least 1 parent with a degree					-0.155	(0.039)***
at least 1 parent with A-levels					-0.043	(0.036)
living in workless household					-0.113	(0.080)
SEC2					0.081	(0.049)
SEC3					0.257	(0.053)***
SEC4					0.366	(0.059)***
SEC5					0.248	(0.059)***
SEC6					0.125	(0.064)*
Constant	1.181	(0.041)***	1.080	(0.066)***	-0.693	(0.085)***
selection λ			0.088	(0.047)*		
Observations	2150		16013			

Notes to Table 4.4:

1. Variable definitions, means and standard deviations are reported in Appendix B.
2. Heteroskedastic-consistent standard errors are given in parentheses; ***, **, * denotes statistically significantly different from zero at 10%, 5% and 1% respectively.
3. Diagnostics - OLS wage equation: $R^2 = 0.2613$.
4. Diagnostics - Heckman selection model (Job/GST *vs* FTE, U/E or Other): 2,150 uncensored observations, 13,863 censored observations; estimation by MLE - log likelihood = -6553.3; test of independence (i.e. $\rho = 0$): $\chi^2(1) = 3.48$ (p = 0.06).
5. Comparison groups are: female; age 17 at January 2002; ethnicity – white; no disability/health problems; no qualifications at end year 11; LEA, CTC or other school at year 11; council or private rented; living with only one or neither parent; neither parent with A-levels or degree; at least one parent working; SEC1: higher professional; regressions also include dummy for ethnicity - missing.

Table 5.1

Distribution of hourly pay in YCS Cohort 11, Sweep 1

A: Summary statistics	Hourly pay:		Percentiles of hourly pay:				
Group:	mean	trimmed mean	*p10*	LQ *p25*	median *p50*	UQ *p75*	*p90*
1. FTE and working	£3.88	£3.76	£2.50	£3.08	£3.69	£4.38	£5.19
2. GST	£2.44	£2.31	£1.25	£1.55	£2.14	£3.04	£3.83
3. Job (full-time or part-time)	£3.86	£3.71	£2.31	£3.00	£3.66	£4.38	£5.12
In the labour market (2 + 3)	£3.22	£3.09	£1.44	£2.09	£3.11	£3.97	£4.80
All with earnings (1 + 2 + 3)	£3.63	£3.51	£1.90	£2.78	£3.50	£4.23	£5.00

B: Cumulative distribution %	Cumulative percentage with hourly pay less than:						
Group:	£2.00	£2.50	£3.00	£3.50	£4.00	£4.50	∞
1. FTE and working	4.3	8.8	20.6	41.7	61.0	77.1	100
2. GST	42.6	61.4	73.4	84.7	91.7	95.2	100
3. Job (full-time or part-time)	4.9	12.6	24.2	42.6	61.4	77.5	100
In the labour market (2 + 3)	22.0	34.7	46.5	61.6	75.1	85.5	100
All with earnings (1 + 2 + 3)	10.9	18.5	30.2	49.2	66.3	80.2	100

Notes to Table 5.1:

1. The 'trimmed mean' is the mean of the truncated distribution when the top and bottom 5% of the observations are removed in order to mitigate the impact of measurement error/outliers.
2. *pX* is the X^{th} percentile of the distribution of hourly pay. The median is therefore *p50* etc.
3. The cumulative distribution presents the percentage of each group earning less than the indicated upper bound on hourly pay. Thus, the bottom row reveals that 10.9% of all those reporting earnings have take-home pay of less than £2.00 per hour.

Table 5.2

Expected wages resulting from different minimum wage levels

Minimum wage £ per hour: w_{min}	Coverage: Job and GST		Coverage: Job only	
	Expected wage £ per hour	$\frac{dV_{16}}{V_{16}}$	Expected wage £ per hour	$\frac{dV_{16}}{V_{16}}$
0 (base)	£3.22	0	£3.86	0
£2.00	£3.34	3.7%	£3.89	0.8%
£2.25	£3.40	5.6%	£3.91	1.3%
£2.50	£3.48	8.1%	£3.94	2.1%
£2.75	£3.58	11.2%	£3.98	3.1%
£3.00	£3.69	14.6%	£4.03	4.4%
£3.25	£3.81	18.3%	£4.10	6.2%
£3.50	£3.96	23.0%	£4.20	8.8%
£3.75	£4.12	28.0%	£4.32	11.9%
£4.00	£4.31	33.9%	£4.47	15.8%

Table 5.3

Simulating the impact on participation of differing values of the minimum wage

$F(p)$ = uniform distribution;
Participation elasticity ε = 0.29

Minimum wage £ per hour: w_{min}	Coverage: Job and GST		Coverage: Job only	
	$\frac{dV_{16}}{V_{16}}$	Predicted FTE participation	$\frac{dV_{16}}{V_{16}}$	Predicted FTE participation
0 (base)	0	70.7%	0	70.7%
£2.00	3.7%	69.6%	0.8%	70.5%
£2.50	8.1%	68.4%	2.1%	70.1%
£3.00	14.6%	66.5%	4.4%	69.4%
£3.50	23.0%	64.0%	8.8%	68.1%
£4.00	33.9%	60.9%	15.8%	66.1%

Table 5.4

Impact on participation of alternative distributional assumptions for *F*(*p*)

$F(p)$ = Beta distribution

A: Inequality in ability: $\alpha = \beta < 1$

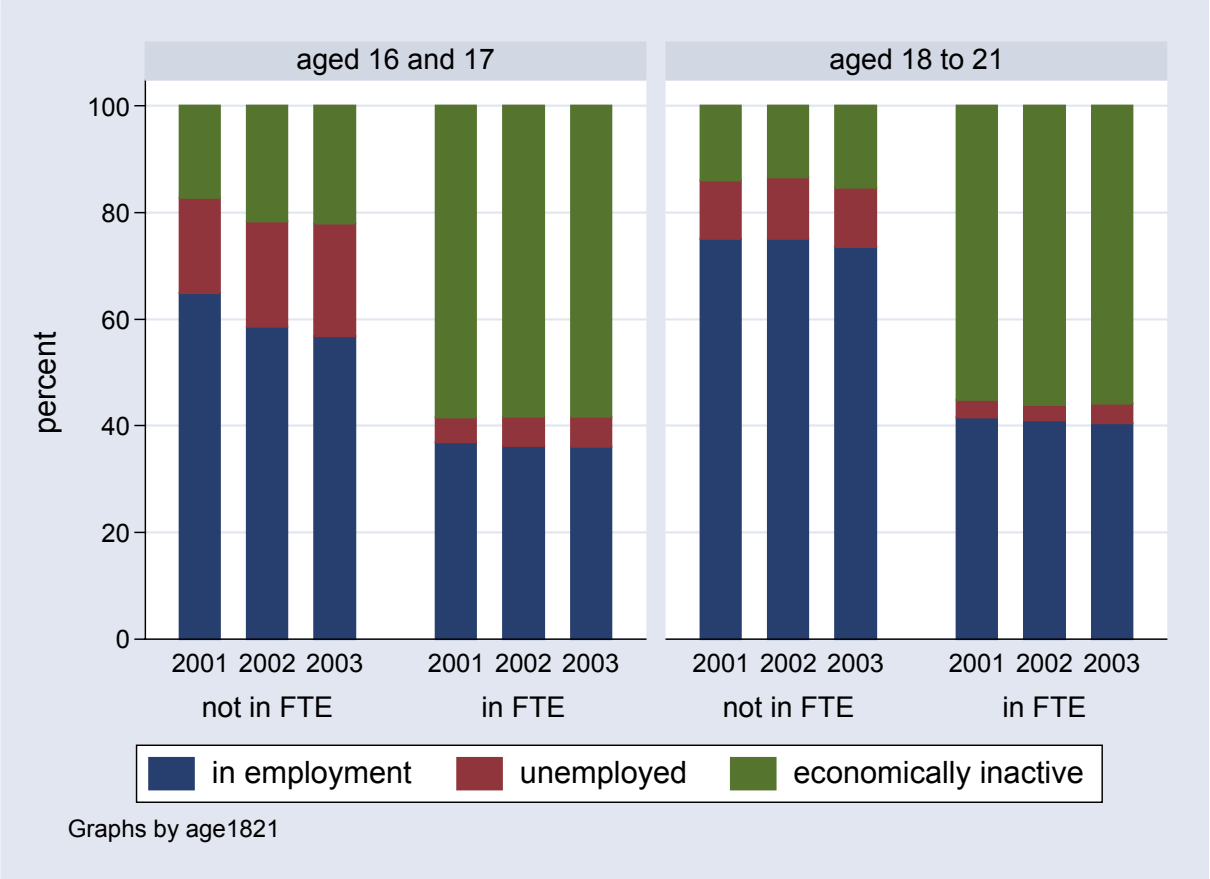
Inequality in ability:	moderate	high	moderate	high
Participation elasticity:	ε = 0.013	ε = 0.007	ε = 0.013	ε = 0.007
Minimum wage w_{min}:	Coverage: Job and GST		Coverage: Job only	
0 (base)	70.7%	70.7%	70.7%	70.7%
£2.00	70.7%	70.7%	70.7%	70.7%
£2.50	70.6%	70.6%	70.7%	70.7%
£3.00	70.5%	70.6%	70.6%	70.7%
£3.50	70.4%	70.5%	70.6%	70.6%
£4.00	70.3%	70.5%	70.5%	70.6%

B: Skewness in ability: $\alpha > 1,\ \beta = 1$

Skewness in ability:	moderate	high	moderate	high
Participation elasticity:	ε = 0.52	ε = 0.84	ε = 0.52	ε = 0.84
Minimum wage w_{min}:	Coverage: Job and GST		Coverage: Job only	
0 (base)	70.7%	70.7%	70.7%	70.7%
£2.00	68.8%	67.6%	70.3%	70.0%
£2.50	66.5%	63.9%	69.6%	69.0%
£3.00	63.1%	58.4%	68.4%	67.0%
£3.50	58.7%	51.4%	66.1%	63.3%
£4.00	53.1%	42.3%	62.5%	57.4%

Figure 2.1

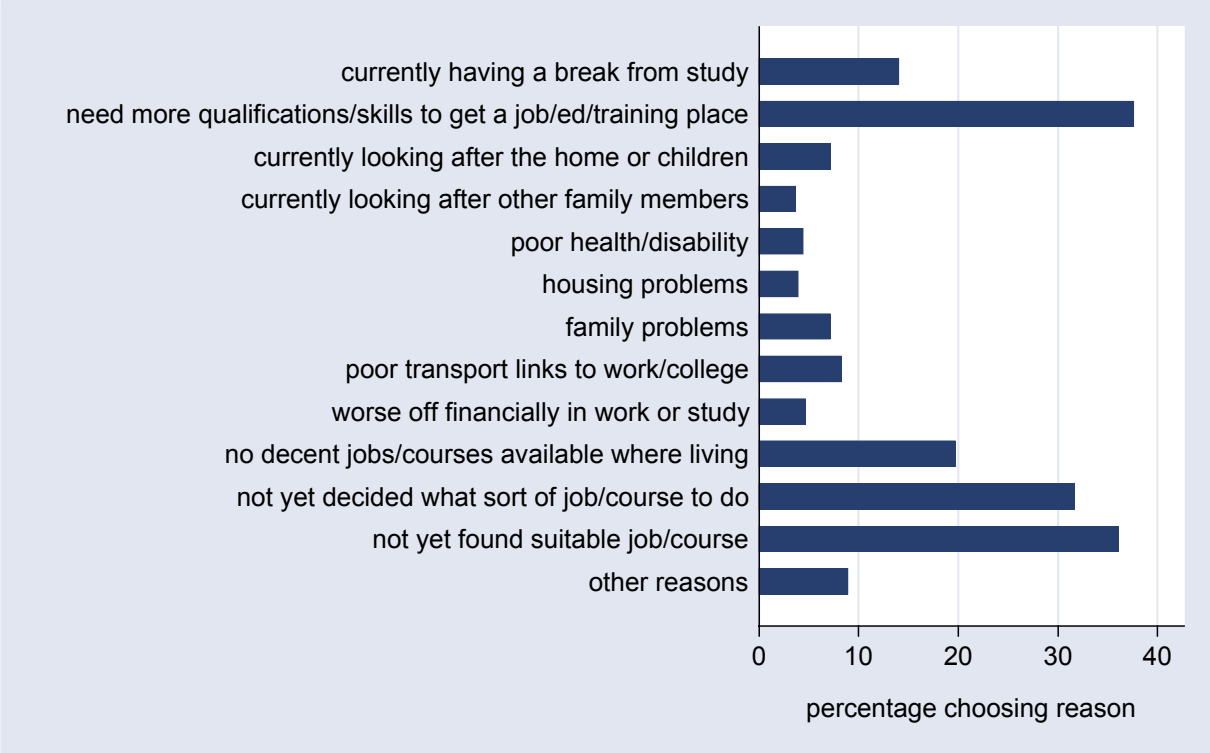
Education and labour market status composition by age group



Source: LFS Spring quarters 2001-2003

Figure 2.2

Reasons cited for inactivity: YCS Cohort 11, Sweep 1

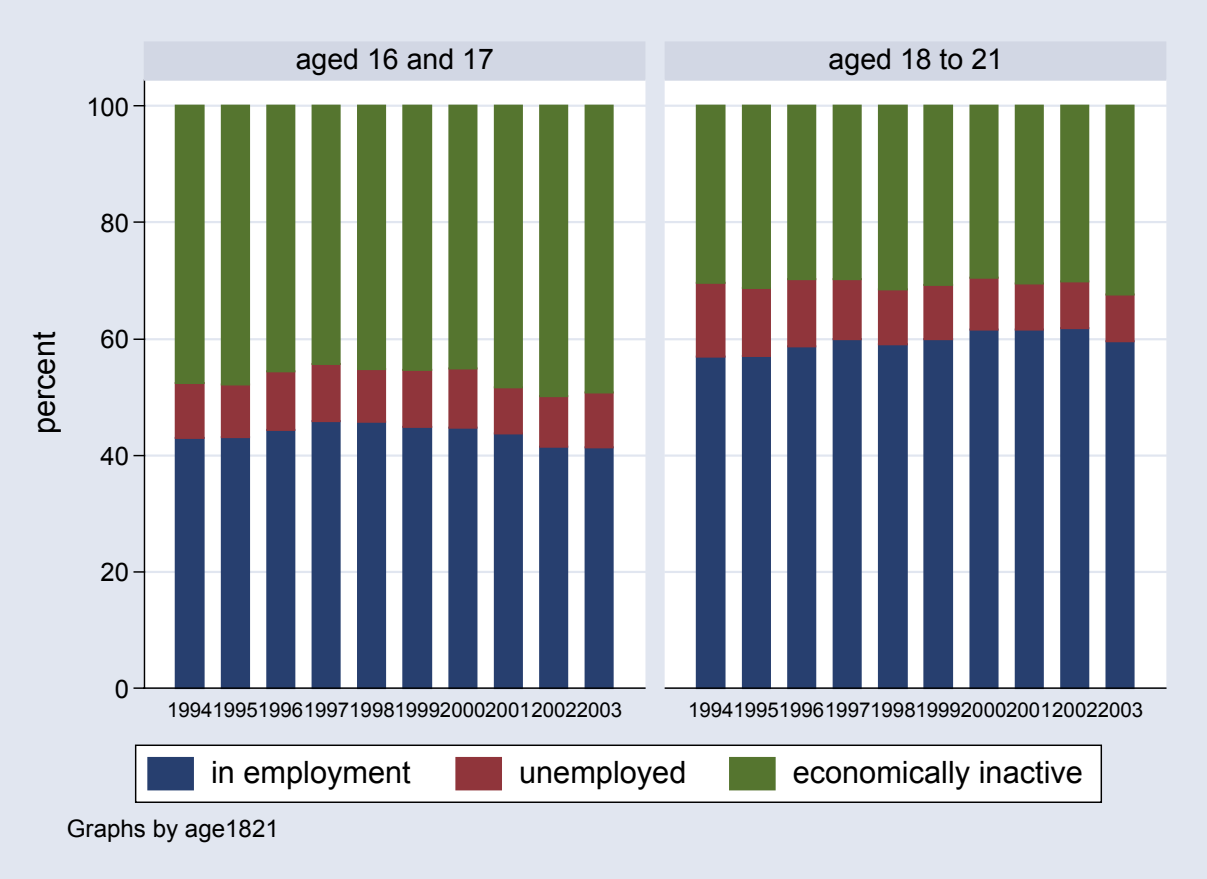


Source: YCS Cohort 11, sweep 1.

Note: Multiple responses are permitted. Percentages expressed as a proportion of all those who are YCS inactive – see text for details.

Figure 2.3

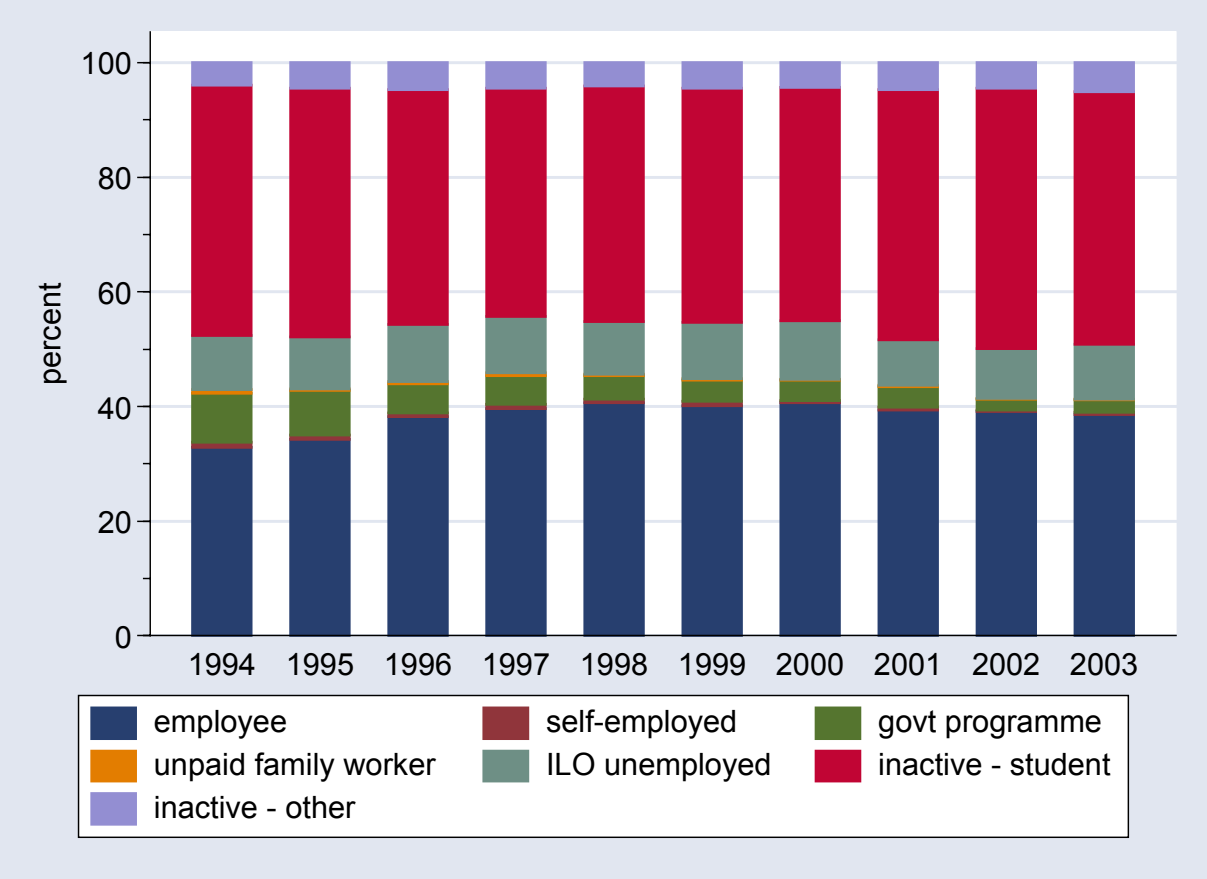
Labour market composition by age group



Source: LFS Spring quarters 1994-2003

Figure 2.4

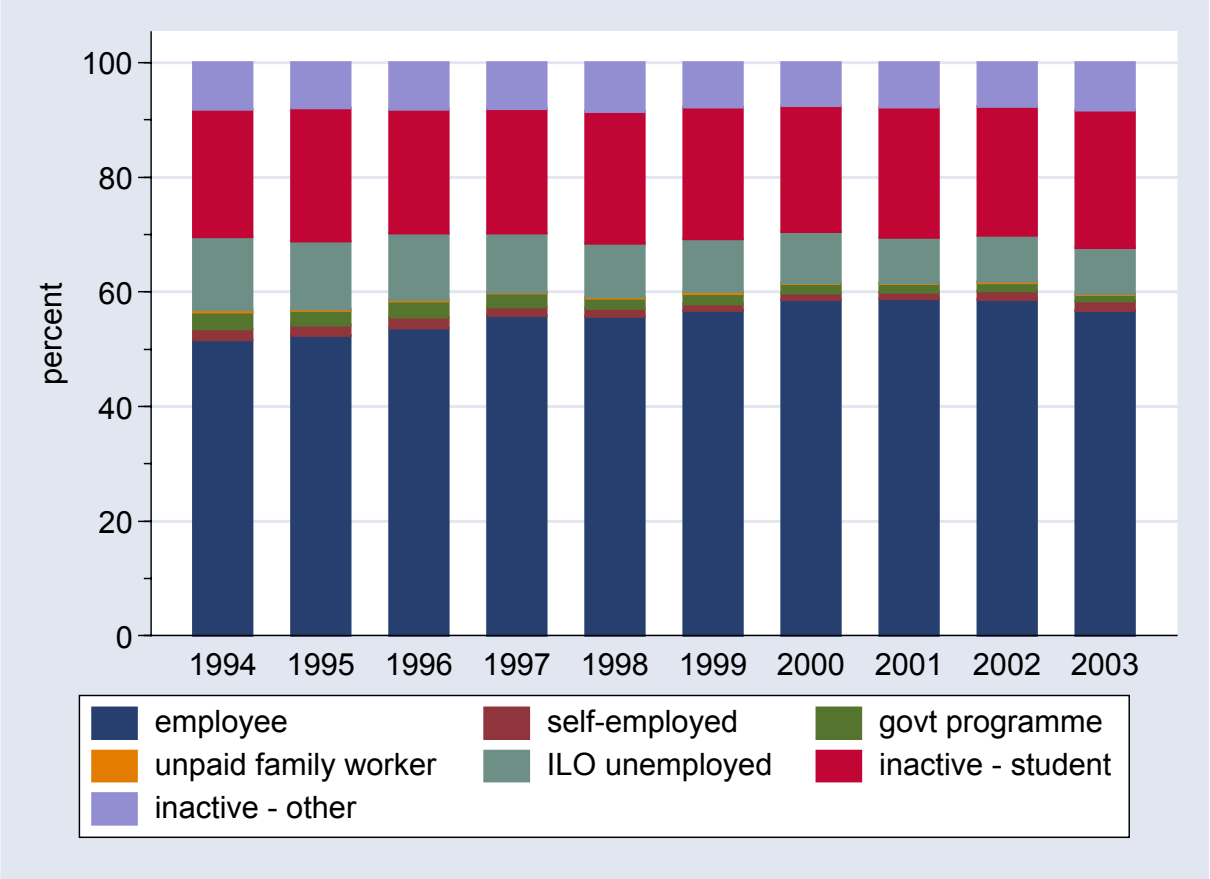
Economic activity aged 16 and 17, 1994-2003



Source: LFS Spring quarters 1994-2003

Figure 2.5

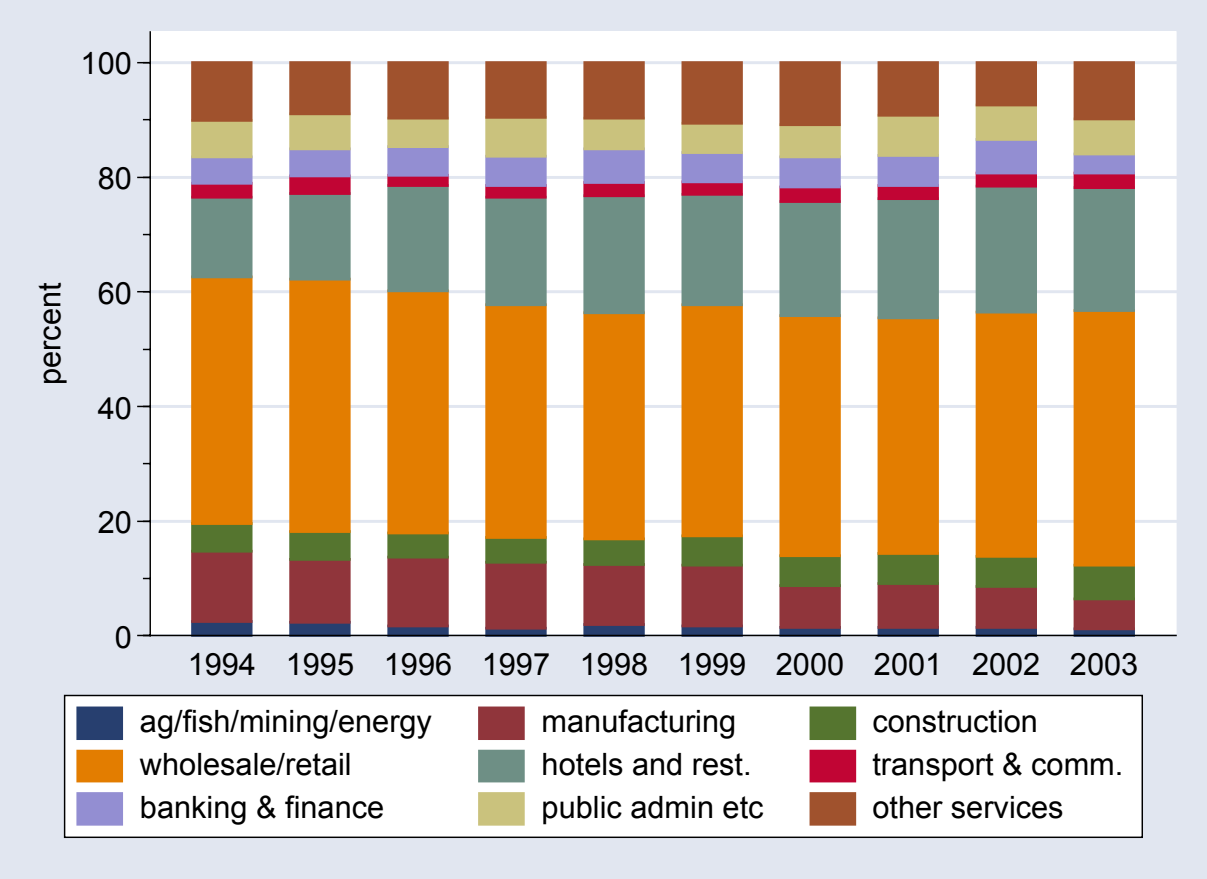
Economic activity aged 18 to 21, 1994-2003



Source: LFS Spring quarters 1994-2003

Figure 2.6

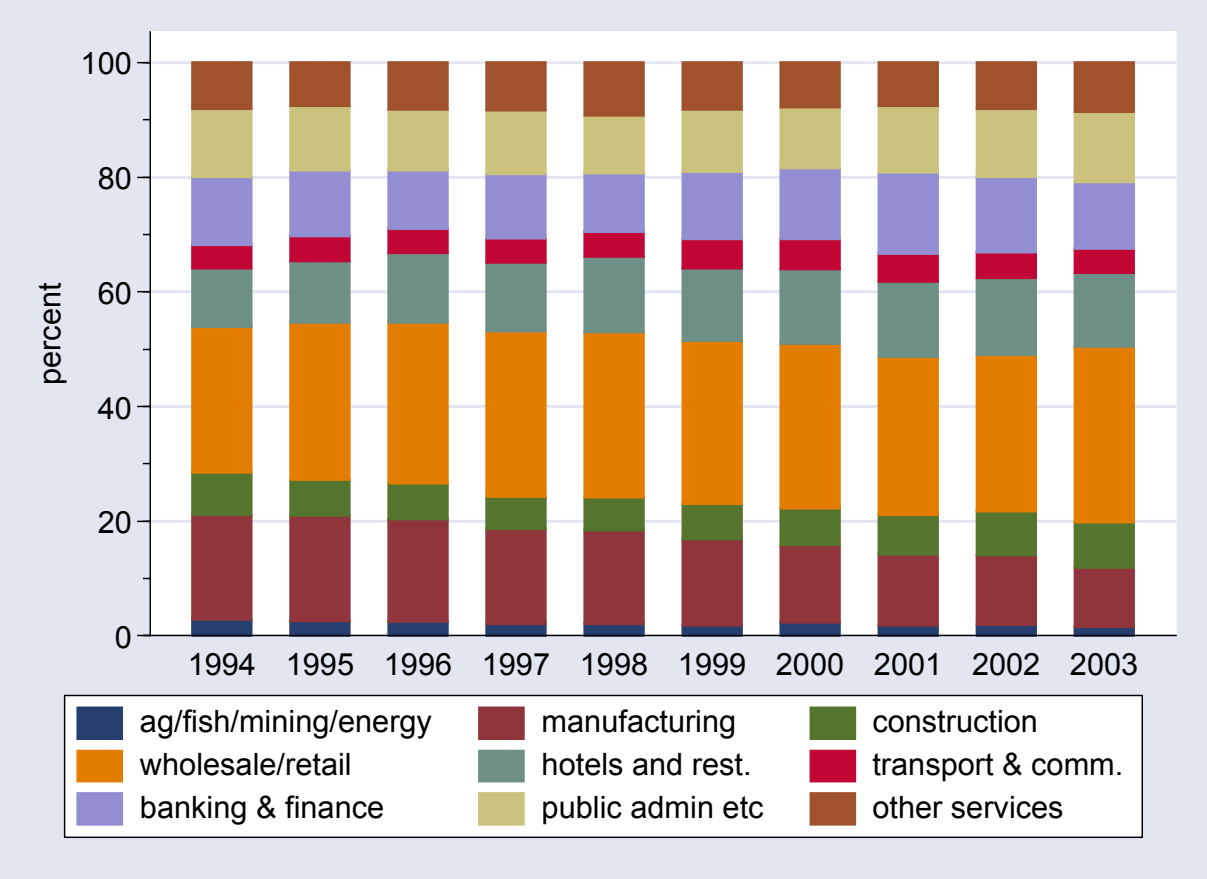
Industrial composition aged 16 and 17, 1994-2003



Source: LFS Spring quarters 1994-2003

Figure 2.7

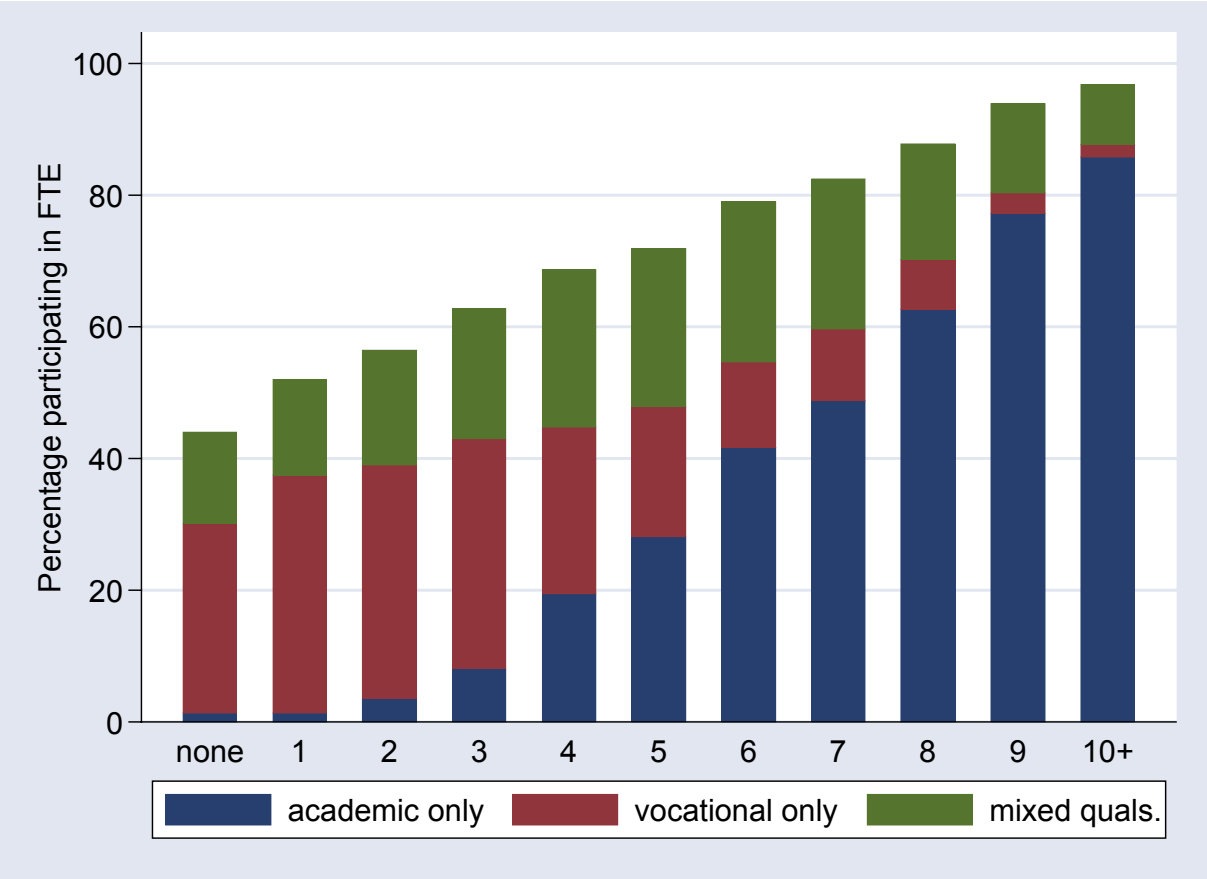
Industrial composition aged 18 to 21, 1994-2003



Source: LFS Spring quarters 1994-2003

Figure 5.1

FTE participation and number of GCSEs at grades A*-C:
YCS Cohort 11, sweep 1



Source: YCS Cohort 11 sweep 1.

Figure 5.2

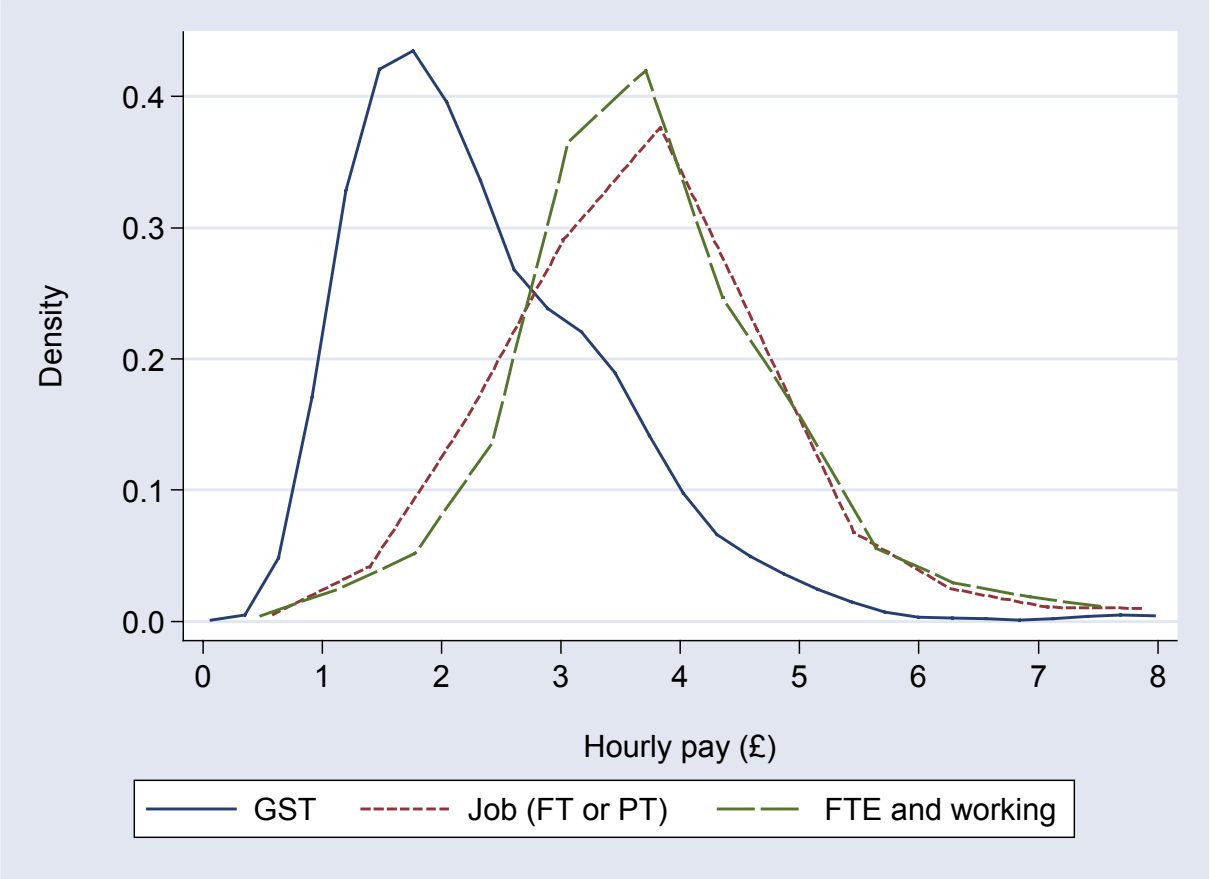
The distribution of hourly pay: YCS Cohort 11, sweep 1

Source: YCS Cohort 11, sweep 1.

Note: Hourly pay for all individuals who report some earnings (i.e. in GST, or in a job (full-time or part-time), or in FTE and working.

Figure 5.3

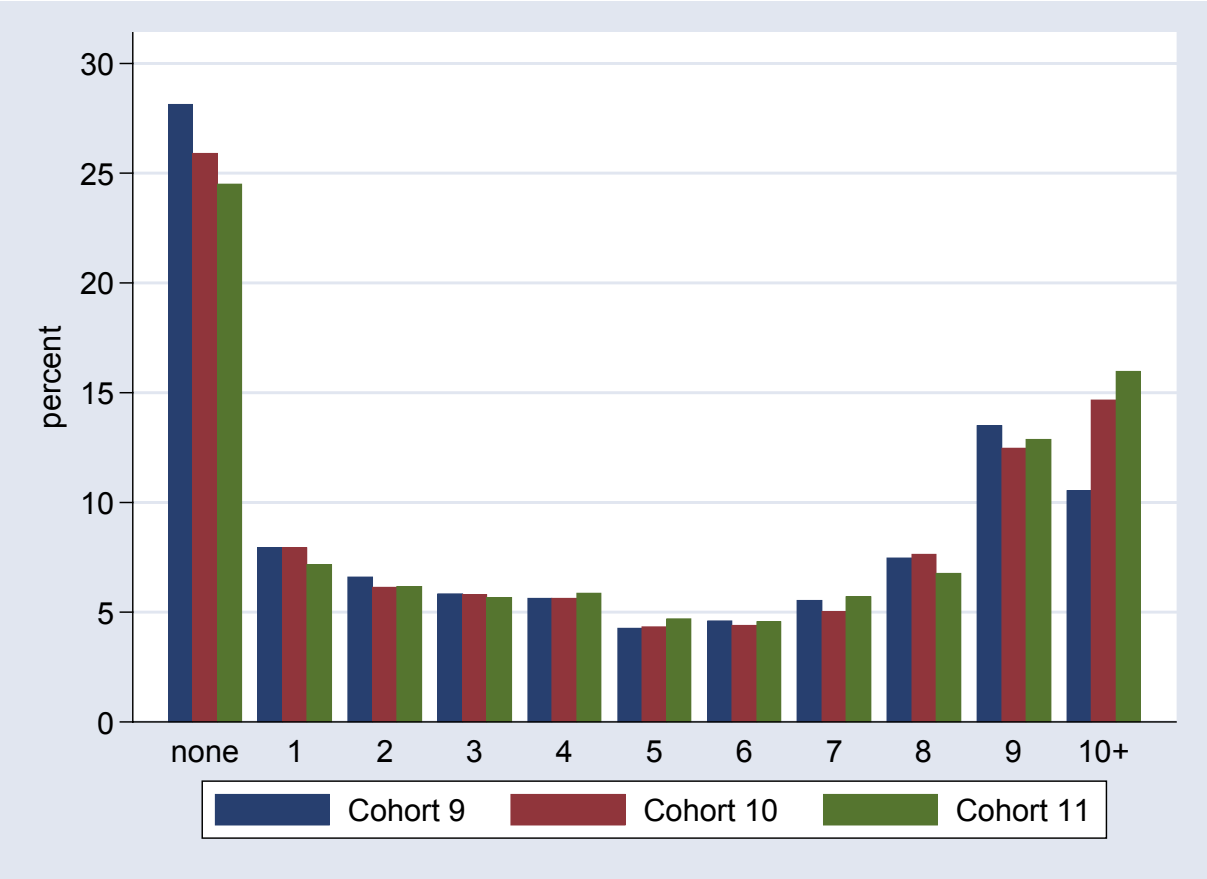
The distribution of hourly pay across different groups with earnings



Source: YCS Cohort 11, sweep 1.

Figure 5.4

The distribution of GCSE grades A*-C at end of year 11
YCS Cohort 9, 10, and 11, sweep 1

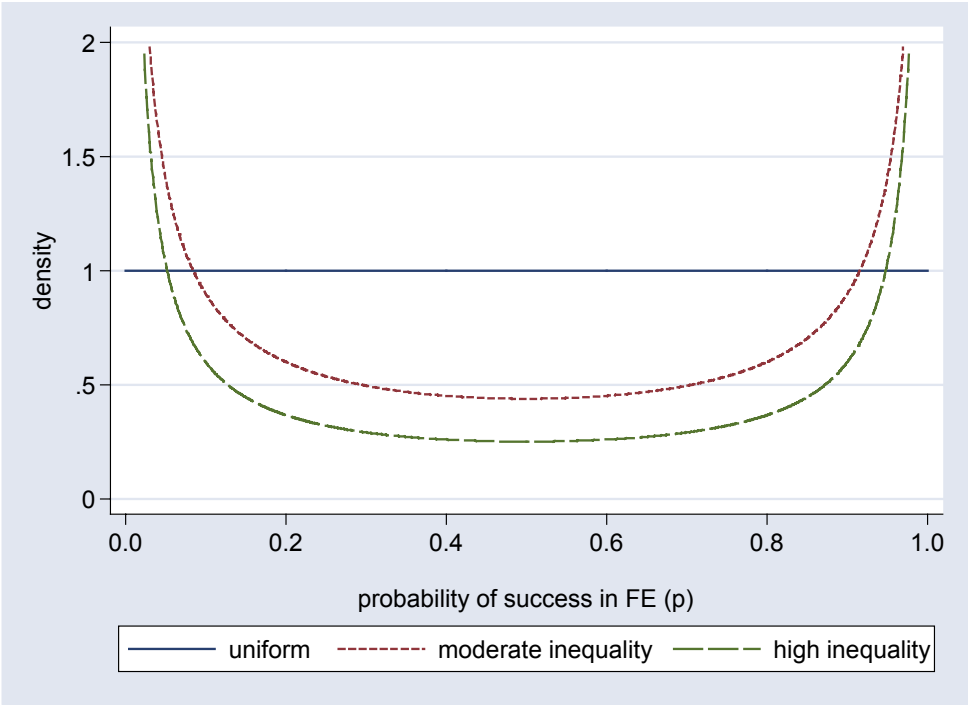


Source: YCS Cohort 9 sweep1; Cohort 10 sweep 1 and Cohort 11 sweep 1.

Figure 5.5

Alternative distributional assumptions for *F(p)*

A: Inequality in *p*



B: Skewness in *p*