Trends in HE participation by neighbourhood: evidence for Wales - Update

Oscar Marcenaro-Gutierrez and Anna Vignoles

Centre for the Economics of Education at the Institute of Education

1. Introduction

This report analyses trends in higher education participation in Wales since the early 1990s. This is a particularly interesting time period to consider. In 1998, up front tuition fees for degree courses were introduced in England and Wales. Although poorer students are exempt from such fees, or at least pay lower amounts, many commentators predicted that tuition fees would cause student numbers to fall. In Wales, student maintenance grants were reduced, and then abolished before being reintroduced in limited form in September 2002[12]. This too was expected to depress student numbers. At the very least, critics argued, these financial changes would reduce the number of *applicants* to HE[3] and it is likely that students from the poorest groups in society would be those most likely to be put off by the introduction of tuition fees. On the other hand, many economists argued that, quite apart from the efficiency and equity arguments in favour of the introduction of tuition fees for HE (see for example Barr and Crawford (1998); Dolton, Greenaway and Vignoles (1997)), the huge wage gains from a degree, combined with a relatively low tuition fee, would be unlikely to put students off going to university. This may of course be true in general but not apply to poorer credit constrained students, whose access to HE is anyway highly limited and potentially more affected by such financial changes.

We know from other evidence (Galindo-Rueda, Marcenaro-Guttierez and Vignoles (forthcoming and reproduced at Appendix B)), that inequality in access to HE by young people is largely attributable to inequalities earlier in the education system, particularly at GCSE. Poorer students are more likely to underachieve in primary and secondary school and are therefore less likely to achieve the necessary GCSEs and A levels to go on to Higher Education. Indeed the evidence suggests that for a given level of A level achievement, poor and rich students have a more or less equal chance of progression into HE. But just because significant inequalities in educational attainment at earlier ages are

[1] These are means tested and are for up to £1,500pa.
[2] Student loans have replaced the grant system. The current maximum level of student loan is £4,930 (for students living away from home in London).
[3] Given that the supply of HE places is constrained, it is possible for student demand to fall whilst overall student numbers do not. In effect the excess demand for HE might have been reduced by the introduction of tuition fees.

observed, does not mean this inequality is unrelated to problems in HE at the point of entry. Students may look forward and anticipate barriers to participation in HE and make less effort in school as a result. Indeed there are many such potential barriers to HE participation, not least of which is the expected cost of HE and the role of student expectations (see for example Connor et al. (2001); Jackson et al. (2004)). Thus poorer students may put in less effort at school, particularly at GCSE, simply because they do not anticipate being able to access higher education anyway. Another reason it is important to look at access to HE by poorer students, rather than just focus on their lack of achievement in school, is that increasingly students enter HE without A levels, with alternative or indeed no qualifications, and at an older age.

This report therefore focuses on differences in participation in HE by students from poor and rich backgrounds, which has been of long standing concern in Wales (as in other countries of the UK). Indeed there is recent empirical evidence for both England and Wales that inequality of access to HE has actually been increasing (see Blanden et al. (2002); Galindo-Rueda and Vignoles (2002); Machin and Vignoles (2003)), further increasing policy interest in this issue. This report is especially topical, given the upcoming further changes to the financial regime in HE in Wales (Rees 2005). In Wales, as in England, HEIs will be able to charge fees of up to £3,000 (up from the current level of £1,200) from 2007/8. However, unlike in England, Welsh domiciled students attending Welsh HEIs will be able to receive a £1,800 grant, which offsets the additional fees entirely. Furthermore, from 2006/7 the £1,200 fee paid by the student will not need to be paid back until after the student graduates from university (i.e. a deferred fee scheme). The Welsh government has also announced a bursary scheme to promote wider access to HE by providing targeted grants to certain groups of students at risk of not participating in HE.

The purpose of this report is to investigate the extent to which students from poorer neighbourhoods in Wales are less likely to participate in higher education, as compared to their counterparts who live in wealthier areas. We focus on examining broad trends in HE participation, recognising that to some extent the problems of inequality of access to HE

are rooted in the school system rather than at the entry point into higher education. Part of the purpose of the report is to determine (as best we can with the limited available data) whether the problem of unequal access to HE in Wales has been worsened by the 1998 changes in funding regime, although we do not restrict our analysis to those directly affected by changes in the funding arrangements. We argue that in fact changes in the funding of full time undergraduates may have had knock on effects on both the level and nature of students' participation in HE. We therefore look quite broadly at trends in HE participation amongst full time and part time students, at degree and sub-degree level. The project will inform policy-makers about the gap in HE participation rates between richer and poorer neighbourhoods in Wales, and how this gap has changed over time. Specifically, we will analyse trends in HE participation in Welsh neighbourhoods over time for different groups of students for the period 1994-2004. Given that Wales has 40% of students studying part-time, which is a higher percentage than elsewhere in the UK, we will pay particular attention to part-time students and indeed other non traditional HE students, such as those studying at sub-degree level. From a policy perspective, it will provide policy-makers with crucially important information about the extent to which certain groups in society, e.g. those from lower socio-economic backgrounds, are likely to have lower demand for HE, particularly following the introduction of tuition fees.

The data preparation for this project has already been carried out for an earlier Department for Education and Skills funded project (Galindo-Rueda et al. 2004), which looked at England and Wales together. From these data we have extracted information on the subset of UK HE students who are both domiciled in Wales (defined as those students with a Welsh postcode) and also attending a higher education institution anywhere in the UK. We also have data from the Census on the number of young people in each Welsh postcode and can therefore identify postcodes with low or high HE participation, given their demographic make up. These data can be combined with information on income levels across all postcodes in Wales, to give an indication of HE participation by neighbourhood income level. This enables us to explore differences in HE participation across different types of neighbourhood, as well as examine whether changes over time are different for richer and poorer neighbourhoods. Wherever possible we will also make inter country comparisons between Wales and England.

2. Methodology and Data

Although the methods used here are identical to those used in our previous report on this issue (Galindo-Rueda et al. 2004), to aid the reader we will set out the main methodological difficulties again and explain in detail how we intend to analyse HE participation in Wales before and after the introduction of tuition fees. Whilst this report provides evidence on participation in HE by students from different backgrounds, its purpose is not to provide estimates of the causal impact of tuition fees. Methodologically, determining the true effect of tuition fees on the demand for HE is problematic given that tuition fees were introduced universally across England and Wales. There was no "experiment" to determine the impact of fees on student demand, for example by introducing tuition fees in some areas but not others, or for some groups of students but not others (as has been done for the Education Maintenance Allowance scheme). Simply looking at student numbers before and after the introduction of tuition fees is likely to be informative but quite problematic, given that there has been a secular rise in the number of HE entrants over the last 30 years. Using time series data to determine whether the rise in student numbers has been less than it would have been without tuition fees is not likely to give statistically robust and precise estimates of the impact of tuition fees.

Our approach is therefore to analyse cross sectional differences in HE participation across different types of neighbourhood, as well as trends in HE participation over time for different groups of students. Whilst this cannot give a definitive causal impact of tuition fees on the demand for HE (i.e. we cannot estimate an elasticity of demand for higher education), it will nonetheless be able to inform policy-makers of any downturn in student demand following, for instance, the introduction of fees. Specifically it will alert policy-makers if certain groups in society, e.g. those from lower socio-economic backgrounds, are likely to have lower demand for HE following further increases in tuition fees.

The data we use comes largely from the Higher Education Statistics Agency. The data set includes limited information (gender, ethnicity, university, degree subject, home postcode etc.) on all students in HE. We have data from 1994 to 2004. As we are most interested in the impact of tuition fees on the participation of poorer students, and as the HESA data set does not contain information on the income or social class of the student's parents, we use the student's home postcode as an indicator of their socio-economic status. In this report we focus largely on students from Welsh neighbourhoods, i.e. with Welsh postcodes, although we also give results for England where appropriate. We have merged CACI Paycheck household income data into the HESA database, on the basis of each student's home postcode. CACI data is derived from a commercially produced data set, designed for marketing purposes, and based on over 4 million households[4]. This data set can provide us with an estimate of the income distribution of each postcode, since it contains information on mean income, the standard deviation of income, the number of households and the banded income distribution in that postcode. These data enable us to model HE participation by neighbourhood income level across Wales.

For a full discussion of why this methodology is appropriate see Galindo-Rueda et al. 2004. In brief, this method has many advantages. Firstly, HESA data does not contain information on the actual income level of the student's household, so it is essential to find a meaningful proxy indicator and the income level of students' neighbourhoods serves this purpose. Secondly, the use of postcode premiums to reflect the costs of attracting and teaching certain types of student is already established in the HE sector (although much criticised of course). For example, the role of neighbourhood and environment in influencing HE participation is acknowledged, for example in the use of students' postcodes as widening participation performance indicators for individual institutions. Whilst ideally we would have individual level data on family income for each student, we argue that postcode income levels are a feasible proxy, given the data limitations we face.

There are a number of technical issues that need to be discussed. Firstly, we only have income data for each postcode from CACI for two particular years (1996 and 1999). We

[4] Further details, and an alternative use for these data, can be found in Gibbons (2001).

use the more recent 1999 data and have to assume some stability in the income distribution across different postcodes over the 8-year period. In other words, we have to assume that a neighbourhood that is poor in 1999, is likely to be equally as poor in 1994 and 1998. Another issue is that clearly the number of students attending HE from a particular neighbourhood is dependent on the population in that neighbourhood, particularly the young (age 18-24) population. Thus all our models control for the population in each postcode sector, derived from Census data for 2001. We have had to assume stability of population over time. Comparisons of the 1996 and 1999 CACI data in our previous report (Galindo-Rueda et al. 2004) suggested that these assumptions are reasonable and we do not believe that they are likely to lead to substantial systematic bias. We will, however, have introduced measurement error into two explanatory variables (the income level of the neighbourhood and the population aged 18-24 in the neighbourhood).

A second issue is that some postcodes have been discontinued by the Post Office during the period. We have had to drop such postcodes, constituting 3.05% of the sample[5]. A final issue is where we have missing data on postcode income levels. Where this has occurred we use 1996 income data if available or, if that is missing too, we aggregate the data up to the 4 digit postcode level and impute data on the basis of this more aggregated grouping.

3. Summary Statistics

Figures 1 and 2 show the numbers of students participating in HE (all years including new entrants), by gender and over time, separately for those living in Wales (i.e. with Welsh postcodes) and English domiciled students. Thus just under 70,000 Welsh domiciled students were enrolled in higher education in Wales in 2004[6]. Just under 750,000 English domiciled students were enrolled in HE in the same year. It is important

[5] Some further cleaning of the data was required. We dropped outlier postcodes with very few households (<75) from our sample. This caused us to lose around 1% of postcodes from our sample.

[6] This is consistent with the recent Rees review (2005) which found that of the 120,000 students enrolled in the 12 Welsh HEIs in 2002, just under half were not Welsh domiciled.

to remember that we are focusing on Welsh students rather than Welsh HEIs. Thus many (just over one third) of the Welsh domiciled students enrolled in HE were attending universities outside Wales.

Given that the cohort size in both Wales and England varied very little over this period[7], the raw student numbers shown in Figures 1 and 2 will show the same trend direction as estimates of the HE participation rate. A slight stagnation of the upward trend in student numbers is evident in Wales, following the introduction of tuition fees in 1998. However, the trend then resumes its upward path, for both men and women. The trend in student numbers is similar across both Wales and England. When disaggregated by full time and part time students, a similar pattern emerges. Likewise Figures 3 and 4 show the number of students participating in HE by type of qualification, namely degree and non-degree, and these too follow similar trends to those in Figures 1 and 2[8].

In conclusion, we observe a number of trends from these simple descriptive data. Firstly, the upward trend in student numbers is evident in both Wales and England, although there is evidence that it is stagnating for certain groups of students (e.g. Welsh men). Furthermore, there does not appear to be a major impact from the introduction of tuition fees in Wales, at least in terms of raw student numbers. This is true of England too. Certainly student numbers have continued to rise in Wales and this is clearly good news for those concerned that tuition fees would lead to a dramatic reduction in the number of pupils attending universities. However, these simple descriptive statistics cannot identify more marginal changes in HE participation in Wales and certainly cannot identify differences in participation rates across different types of student. This is particularly important in terms of determining trends after the introduction of tuition fees. For example, tuition fees are not likely to impact on the behaviour of the very rich because the fees are relatively low compared to household income. Equally tuition fees may have

[7] The Annual Abstract of Statistics, No. 139 (2003) suggests very little change in the size of the age 15-19 cohort during this period.

[8] The number of sub-degree students in Wales is relatively small, particularly at the beginning of the period (10,000 students in 1994). This small sample size does place some limits on our analysis, as is discussed later in this report.

no impact on the behaviour of students from poor backgrounds, since these students are exempt from fees. Fees may still, however, have a significant impact on the behaviour of young people from middle-income backgrounds. Thus we need to look more formally at the behaviour of students from neighbourhoods with different levels of economic prosperity.

4. Regression Results

In this section we use regression analysis to investigate the factors influencing HE participation amongst Welsh domiciled individuals. We analyse participation by neighbourhood, identifying differences in HE participation patterns for students from richer and poorer neighbourhoods (postcode sectors). The dependent variable in the regression model is the natural logarithm of the number of students enrolled in HE from each postcode sector (neighbourhood), although the type of student included in the dependent variable varies according to the specification of the model. For example we estimate separate models for all students, for degree students and for sub-degree students, and likewise for full and part-time students. We consider all these groups, not just those directly affected by tuition fees (i.e. full time undergraduate students), since we are interested in long term trends in participation across the whole of the HE sector and because in any case we believe that tuition fees may have an impact on the mode and level of study undertaken by students. For example, more students may opt to enrol part-time and work to finance their studies. All of the specifications include time dummies (base case is 1994/1995), allowing for national trends in HE participation over time. The ordinary least squares (OLS) regressions also include the population estimate of the number of 18-24 year olds living in each postcode. This allows for the fact that postcodes with more young people living in them are likely to have more individuals enrolled in HE.

We start in Table 1 by showing the basic OLS model, which regresses the natural logarithm of the total[9] number of students enrolled in HE in each neighbourhood against

[9] Specifically this includes all postgraduate, degree and sub-degree students regardless of mode of study.

the log of mean household income in each neighbourhood and includes interactions between this income variable and each time dummy variable. The coefficient on the mean income term in column 1 measures the average relationship in Wales between neighbourhood income level and the total number of students enrolled in HE from that neighbourhood, controlling for population size. The coefficient is highly positively significant, suggesting that in both Wales (column 1) and England (column 2) more students are enrolled in Higher Education in richer neighbourhoods. The magnitude of the results indicates that in Wales, neighbourhoods that have 1% higher mean household income levels are likely to have 1.8% more students enrolled in HE. In England, neighbourhoods with 1% higher mean household income have 1.2% more students enrolled in HE.

The fact that richer students are more likely to enrol in HE is well known and therefore it does not come as a surprise that students from richer neighbourhoods are much more likely to go to university. The issue of most concern is whether the relationship between income and HE participation has changed over time, and specifically following the introduction of tuition fees in 1998. The interactions between neighbourhood income and year can tell us whether this relationship has changed. Larger, positive and significant interaction terms for 1999-2004 would suggest that in these later years the relationship between neighbourhood income and HE participation became stronger. In column 1, the interaction terms are all insignificantly different from zero. This implies that in Wales the relationship between neighbourhood income and total HE participation was broadly stable over the entire period. The same is not true of England, where we do observe some strengthening of the relationship between neighbourhood income levels and total HE participation for the period 1995-2000, although this relationship is not consistent from year to year.

Columns 3 and 4 of Table 1 include the same variables but use a fixed effects formulation. This fixed effects model simply tests whether, *within* each postcode, participation is increasing over time. The purpose of using a fixed effects approach is to remove time constant factors that might affect cross-sectional differences in HE

participation across postcodes, and therefore confound trends over time (e.g. education levels in the neighbourhood). The fixed effects model should remove all differences in HE participation across postcodes that are down to fixed characteristics of the postcode that we do not observe and are not explicitly included in our model. In Column 3, the interactions become positive in the 1997-1999 period and marginally significant. However, at the end of the period (2002-2004) we observe sizeable negative coefficients on the interaction terms. This suggests that from 2002 onwards, student numbers increased more rapidly in richer neighbourhoods, as opposed to poorer ones. This contrasts sharply with England, which saw a distinct strengthening of the relationship between neighbourhood income level and HE participation, particularly at the beginning of the period. Table 1 therefore suggests that total HE participation in richer English neighbourhoods increased more rapidly during the early 1990s, as compared to total HE participation in poorer English neighbourhoods. This was generally not the case in Welsh neighbourhoods where if anything the growth in HE participation was faster for poorer neighbourhoods, at least from 2002 onwards. This latter finding is potentially extremely important, given that student grants were re-introduced for full time undergraduates in 2002 in Wales. We explore this issue further below when we look at participation by level and mode of study. It is also worth noting that the timing of the trends in England suggests that causes other than tuition fees may well be responsible and again we explore this further in the analysis of particular sub-groups.

So far we have investigated total HE participation, including postgraduates and sub-degree students. Tuition fees only directly affected undergraduate students however, so table 2 focuses specifically on first degree students. For first-degree students there is a stronger relationship between neighbourhood income and the likelihood of being enrolled in a first degree than was the case for the entire HE student body (i.e. the coefficients on log income are larger in the OLS specification). Furthermore, this relationship is considerably stronger for Welsh domiciled students, suggesting that socio-economic background is more strongly associated with first degree HE enrolment in Wales. Thus in Wales a 1% increase in mean neighbourhood income is associated with a 2.1% higher first degree participation level. In England, a 1% higher mean neighbourhood income

level is associated with a 1.3% increase in the numbers enrolled on first-degree courses in HE. In Table 2, column 1, which is the OLS regression, the interactions between income and year are insignificant in Wales up to 2002. This confirms the results of Table 1, namely that there was no strengthening of the relationship between neighbourhood income and first degree HE participation in Wales during the early period and immediately after the introduction of fees. However, even in the OLS we observe negative (marginally) significant coefficients on the income interaction terms from 2002 onwards. In the fixed effect specification, the lessening of the relationship between neighbourhood income and the numbers of students participating in HE becomes highly significant. Thus enrolment on first degrees grew more rapidly in poorer neighbourhoods for the period 2002 onwards, i.e. after the re-introduction of the student grant. For England by contrast we see a strengthening of the link between neighbourhood income and first degree HE participation in the fixed effect model.

One might also expect that tuition fees might impact on mode of study, with potentially students shifting to part-time study as a result of tuition fees and the abolition/ reduction of grants. This might be particularly important in Wales where a higher proportion of students are part-time. Thus in Tables 3 and 4, we consider all[10] full-time and part-time students respectively. The pattern for full time students shown in Table 3 is similar to that observed in Tables 1 and 2, namely that there is a strong link between neighbourhood income level and full time HE participation and that it increased in strength in England during the period, whilst it lessened in Wales from 2002 onwards. To help the reader, the results have also been shown graphically in Figure 5. Figure 5 shows the predicted number of full time students enrolled in HE per head of age 18-24 population[11] by type of neighbourhood, showing the richest neighbourhoods (5^{th} quintile of the income distribution), midrange neighbourhoods (3^{rd} quintile) and poor neighbourhoods (1^{st} quintile). The prediction comes from the fixed effects model in Table 3, which controls

[10] Postgraduate, first degree and sub-degree students are included in this specification.

[11] Since we consider the number of students divided by the age 18-24 year old population in the postcode area, these are not HE participation rates, as calculated by the DfES. Instead they help give a graphical representation of the growth in student enrolment by neighbourhood. The actual proportions on the Y axis should not be compared with DfES HE participation rates, particularly the age participation rate, as they have been calculated in very different ways.

for any fixed characteristics of the postcode of the period. The figure therefore is a visual representation of the growth in full time HE participation by type of neighbourhood. Figure 5 shows that full time HE participation in rich neighbourhoods in Wales grew somewhat faster early in the period but that thereafter the richer and poorer neighbourhoods had similar growth rates, i.e. the graphs for rich and poor neighbourhoods stay parallel. From 2002 we see a very slight narrowing of the gap in HE participation between richer and poorer neighbourhoods (i.e. the 5th income quintile line falls somewhat whilst the 3rd and 1st income quintile lines rise). This contrasts to England where the rich neighbourhoods (top 5th quintile graph) had more rapid growth in full time HE participation, as compared to poorer neighbourhoods (the lines diverge during the time period).

The situation for part-time students is different. In the OLS regression in column 1 of Table 4, there is some evidence that the relationship between neighbourhood income and part-time HE participation strengthened in Wales, particularly in 1997 and 1999 (it appears to have also increased in 1996 and 1998 but the standard errors are large and the coefficients statistically insignificant). The fixed effect model in column 3 of table 4 confirms this finding, showing a clear increase in the strength of the relationship between neighbourhood income level and part-time HE participation in Wales for the period 1996-1999. A similar pattern is observed for part-time English domiciled students but the changes are larger and for a longer period (1995-2000). In both countries we observe that the relationship reverses in the latter part of the period, specifically from 2002 onwards for Wales and 2003 in England. Again this can be observed graphically in Figure 6. Figure 6 shows that in Wales between 1996 and 2000 part-time HE participation grew somewhat more rapidly in the richer neighbourhoods than in poor ones, this trend then reverses at the end of the period (i.e. the gap in participation between postcode areas in the 5th quintile of the income distribution and the 3rd quintile closes), although the numbers are small so the trends are slight.

It would appear therefore that there have been particularly pronounced changes in the relationship between socio-economic background and the likelihood of going to

university amongst part time students in Wales. Since tuition fees and the re-introduction of grants affected full time undergraduates only, it is not clear what factors are driving these trends. Further investigation suggested that the weakening of the relationship between neighbourhood income levels and participation in the latter part of the period occurred amongst part-time and full time first-degree students (Table 5).

We then investigated sub-degree students more closely. One needs to be aware however, that the number of Welsh domiciled sub-degree students is relatively small and that this does limit our investigation somewhat. Table 6 shows similar models to those discussed above but focusing on sub-degree full time students, whilst Table 7 focuses on sub-degree part-time students.

Table 6 suggests that there was some strengthening of the relationship between a student's neighbourhood income level and the likelihood of participating in full-time sub-degree level HE, particularly for the period 1996-1998. Interestingly the reverse is true in England, where the coefficients on the interaction terms are actually negative from 1998 onwards. This implies that there was a larger increase in full-time sub-degree participation in England in poorer neighbourhoods as compared to richer neighbourhoods. This might reflect the popularity of sub-degree study among poorer students and indeed some shift from first-degree study to sub-degree study in poorer English neighbourhoods. It may however, also reflect the fact that during the period under consideration there have been a number of changes in the composition of HE, particularly in England. Specifically various forms of new provision were included in the HE statistics over the period, much of which was at sub-degree level, and we are unable to account for this. In addition, changes in the funding of HE through FE will have affected what counted as HE over the period, at least in England. All this means less emphasis should be placed on the sub-degree results. With these caveats in mind, figure 7 confirms the trends discussed above graphically, showing the decline in the growth in sub-degree full time study in Wales, although the small numbers of students involved make it difficult to see trends. In Wales, by contrast to the results for first degree students

in Table 5, we found no lessening of the relationship between neighbourhood income and HE participation amongst sub-degree full time students.

Figure 8 shows that in both Wales and England there was a greater increase in part-time sub-degree HE participation in richer neighbourhoods, as compared to poorer neighbourhoods, at least up to 2000/01. Then in Wales there was some convergence in the HE participation of students from the 3rd and 1st income quintiles. This is confirmed in Table 7. Given that policy-makers have viewed part-time and sub-degree study as being one potential mechanism by which one can widen access to HE, the fact that at the beginning of the period there was a somewhat more rapid growth in HE participation amongst middle income students and richer students, as compared to those from the 1st income quintile may be a worrying finding, although the sample sizes are very small and much caution should be attached to these results.

5. Conclusions and Policy Discussion

A key policy question is whether there has been a negative impact on the attempt to widen participation in higher education from the introduction of tuition fees and other HE finance reforms. Specifically, what has been the pattern of HE participation before and after these financial reforms and how does this participation vary by different type of student. In this report we focus particularly on whether HE participation in the 1990s and early 2000s grew more rapidly for those living in richer neighbourhoods as compared to those from poorer areas.

Our principle findings are of great policy interest. Specifically, the good news for policy-makers in Wales is that the introduction of tuition fees appears not to have substantially depressed the overall demand for higher education. This is true in England also. In Wales there was little evidence that full time and degree level HE participation in poorer neighbourhoods had been particularly depressed during the 1990s. More specifically, full time and degree level HE participation grew similarly in rich and poor Welsh neighbourhoods during the 1990s. This contrasts with the situation in England, which

saw more rapid growth in full time and degree level HE participation in richer neighbourhoods. More striking however, is that in Wales there is a clear convergence in the proportion participating in HE from poorer and richer and neighbourhoods from 2002 onwards. In other words, the strength of the relationship between neighbourhood income levels and HE participation started to weaken in Wales in 2002. Whilst this is not a causal analysis, one obvious potential explanation for this is the re-introduction of grants in Wales that may have helped the situation there, as compared to the situation in England.

Further investigation suggested that patterns of part-time and specifically sub-degree level part-time HE participation also varied during the period, although these groups were not directly affected by changes in the financial arrangements for students in HE. Between 1996-1999, there was some widening of the gap in part-time and sub-degree level HE participation between poorer and richer Welsh neighbourhoods (as indeed was the case in England). This means that in Wales the already steep relationship between income level and HE participation got stronger during the period but only for some students, namely part-time and sub-degree level students. Once again however, we observe that the relationship between neighbourhood income level and HE participation lessened from 2002 onwards in Wales, at least for part-time students.

In conclusion, our main findings are that during the 1990s participation in part-time and sub-degree HE study grew more strongly in richer Welsh communities than in poorer ones but also that from 2002 onwards degree level HE participation and more generally part time HE study (including sub-degree part time) in poorer neighbourhoods grew more strongly. We note however, that analysis of trends amongst sub-degree students is particularly difficult due to small sample sizes. The patterns we observe do not suggest that tuition fees are the potential cause of this trend. Firstly many of these groups of students are not directly affected by tuition fees, as fees were only levied on full time first degree students. Secondly, much of the strengthening of the link between neighbourhood income level and part-time/sub-degree HE participation occurred in the early 1990s, i.e. well before the introduction of tuition fees. The finding that part-time and sub-degree HE participation grew more strongly in richer neighbourhoods during the 1990s is obviously

worrying for those committed to widening access to HE in Wales, given that part-time and sub-degree study is viewed by many as the main method of widening access to HE (Rees, 2005). However, as has already been discussed, in Wales there is clear evidence that the gap in HE participation between richer and poorer neighbourhoods reduced from 2002 onwards for many groups of students. For full time first degree students, one potential explanation of the narrowing of the gap in HE participation between rich and poor neighbourhoods is the re-introduction of grants in 2002. This cannot be the only explanation however, as we see similar trends amongst other types of students not directly affected by the re-introduction of grants, such as part-time students.

It is important to recall that in this analysis we cannot talk about causality. For example, we do not control for students' prior attainment (at area level) and thus we cannot be sure whether we are observing increasing socio-economic inequality on entry into HE or the results of increasing inequality emerging far earlier in the education system. In models of HE participation, achievement at A level is the main determinant of access to HE for people from all socio-economic groups, and A level performance is strongly linked to prior disadvantage. For example, related research by Galindo-Rueda, Marcenaro and Vignoles (presented at Appendix B) supports the idea that the substantial social class educational inequality observed in the 90s in higher education in the UK occurred largely as a result of inequalities earlier in the education system, i.e. before the age of 16.Our results should therefore be read as indicative only.

6. References

Barr,N. and Crawford, I. (1998) 'The Dearing Report and the Government Response: A Critique', *Political Quarterly*, Vol. 69, No. 1, January - March, pp. 72-84.

Barr, N. (2002) 'Funding Higher Education: Policies for Access and Quality', House of Commons Education and Skills Committee, Post-16 student support, Session 2001-02, 24 April 2002.

Blanden, J., P. Gregg and S. Machin (2003) 'Changes in Educational Inequality', Centre for the Economics of Education mimeo.

Dearden, L, McIntosh, S. , Myck, M. and Vignoles, A. (2002) 'The Returns to Academic, Vocational and Basic Skills in Britain', *Bulletin of Economic Research*, vol 54, no. 3, pp. 249-274.

Dolton., P., Greenaway, D. and Vignoles, A. (1997) 'Whither Higher Education ? An Economic Perspective for the Dearing Committee of Inquiry', *Economic Journal*, Vol. 107, No. 442, pp.710-726.

Galindo-Rueda, F., Marcenaro-Gutierrez, O. and Vignoles, A. (2004) 'The Widening Socio-economic Gap in UK Higher Education', *National Institute Economic Review*, No. 190, pp.70-82.

Galindo-Rueda, F., Marcenaro-Gutieerez, O. and Vignoles, A. (forthcoming) 'Who actually goes to University', *Empirical Economics*.

Galindo-Rueda, F. and A. Vignoles (2002), 'Class ridden or meritocratic?: An economic analysis of recent changes in Britain', IZA Discussion Paper 677,

Gibbons, S. (2001) 'Paying for Good Neighbours? Neighbourhood Deprivation and the Community Benefits of Education', Centre for the Economics of Education, Discussion Paper No. 17, London School of Economics.

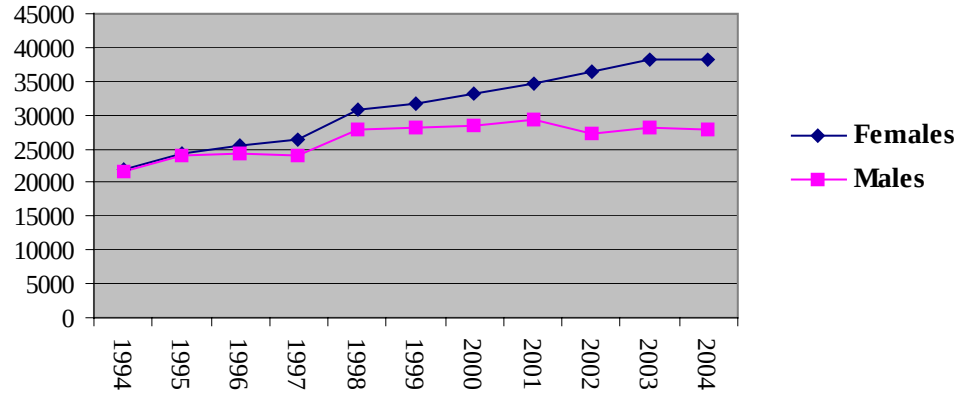
Machin, S. and Vignoles, A. (2003) ‘Education Inequality’, draft summary report for the Department for Education and Skills, submitted March 2003.

Rees, T (2005) *Fair and Flexible Funding: A Welsh Model to Promote Quality and Access in Higher Education*, Final Report of an Independent Study into The Devolution of Student Support and Tuition Fee Regime to Wales: 'The Rees Review'.

Sianesi, B. (2003) ‘Returns to Education: A non-technical summary of CEE work and Policy Discussion’, draft report for Department for Education and Skills.

Figure 1

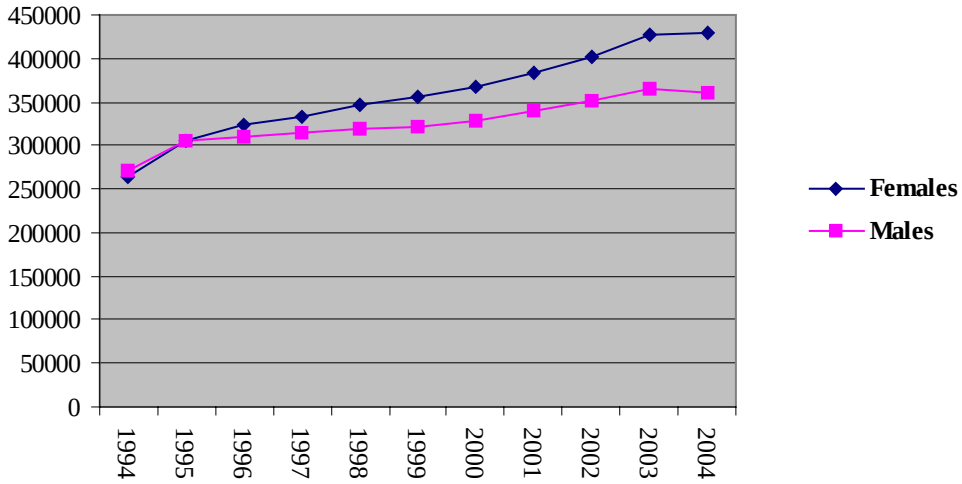
HE participation Wales (overseas excluded), by gender



* Higher Education Statistics Agency Data. Excludes overseas students. Includes full and part-time students, sub-degree, degree and postgraduate.

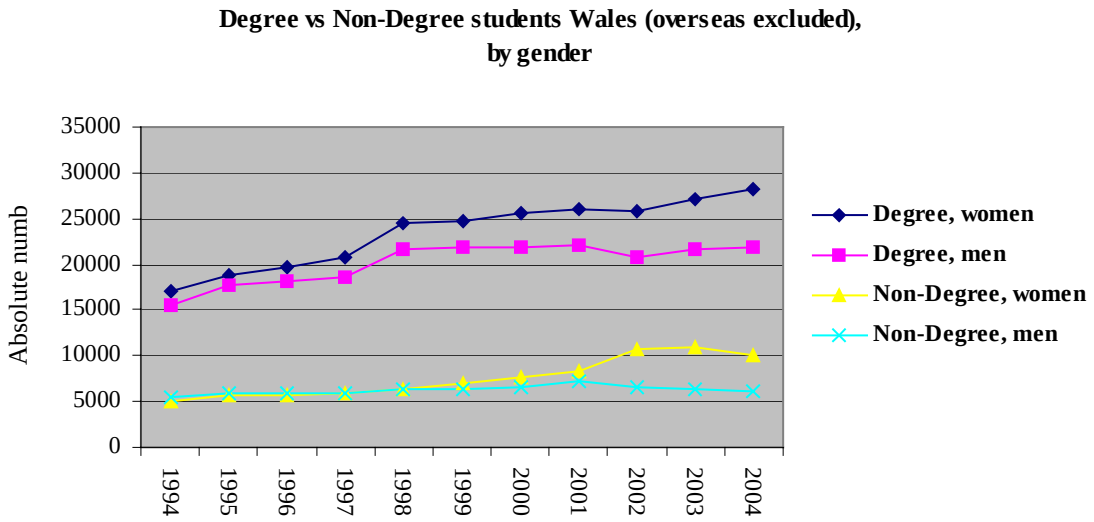
Figure 2

HE participation England (overseas excluded), by gender



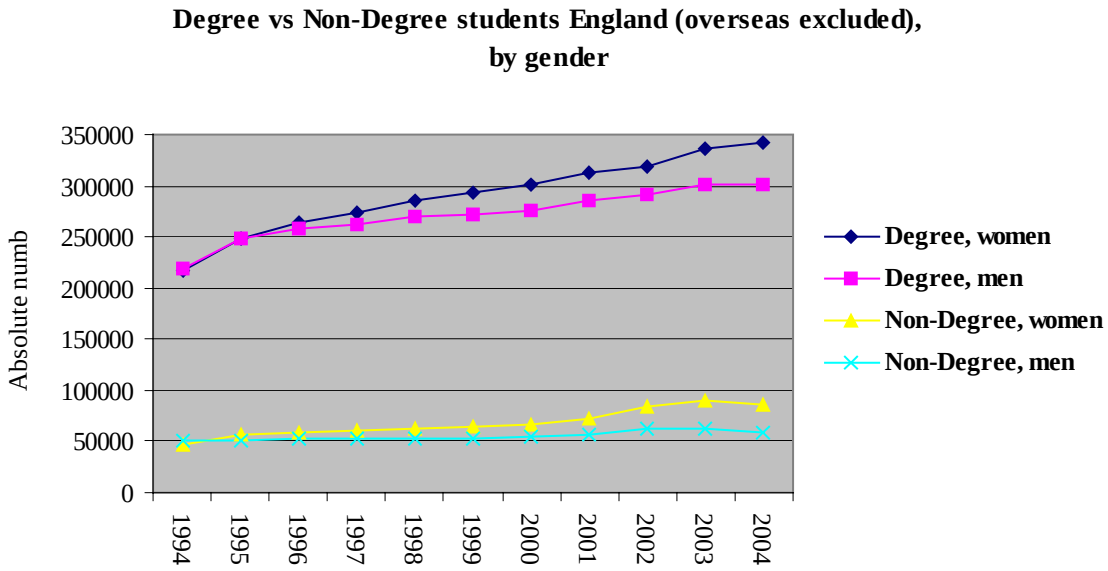
* Higher Education Statistics Agency Data. Excludes overseas students. Includes full and part-time students, sub-degree, degree and postgraduate.

Figure 3



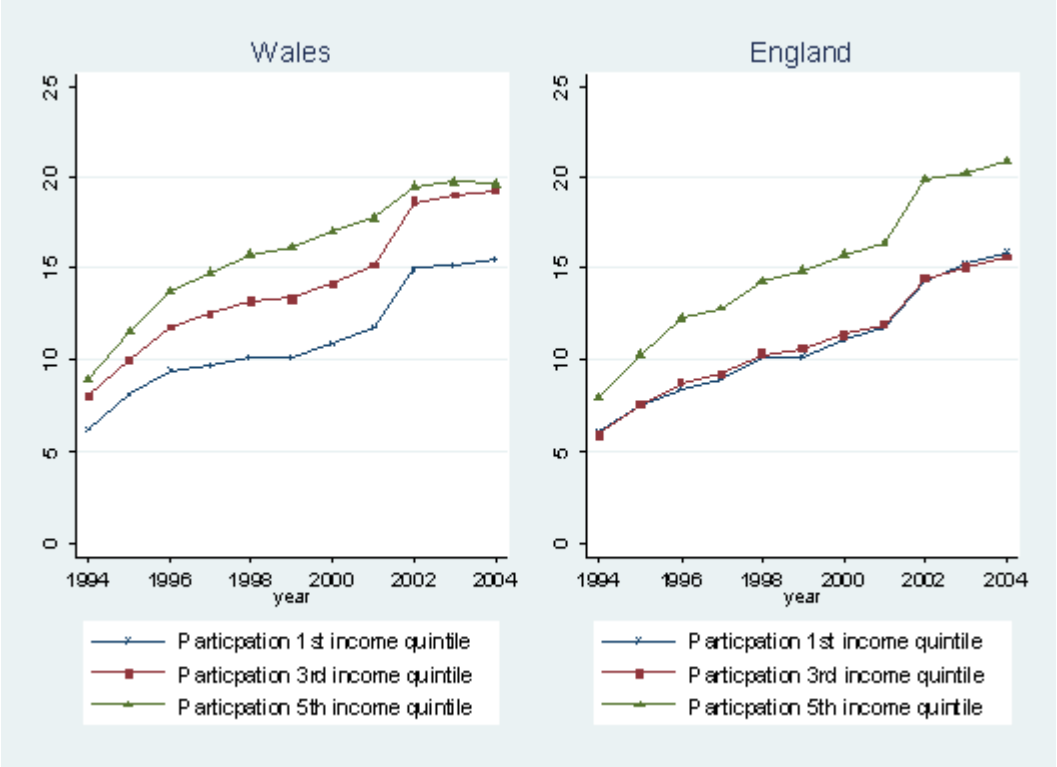
* Higher Education Statistics Agency Data. Excludes overseas students. Includes full and part-time students.

Figure 4



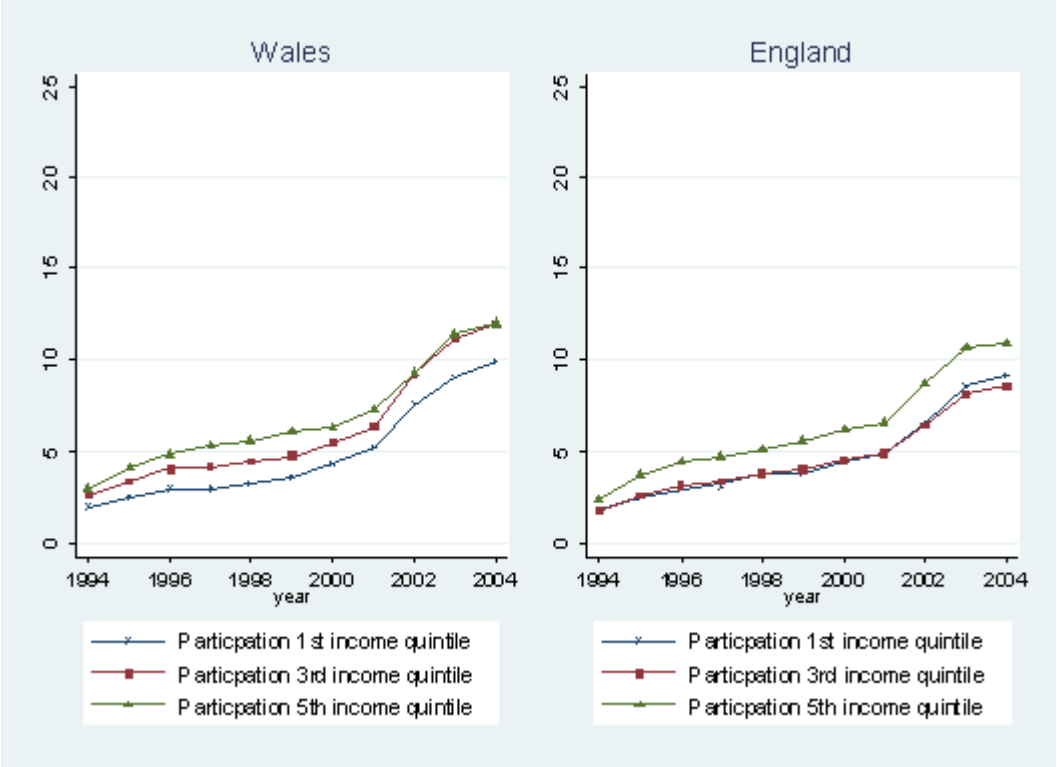
* Higher Education Statistics Agency Data. Excludes overseas students. Includes full and part-time students.

Figure 5: Predicted number of students as a proportion of the 18-24 age group for full time students by country and year



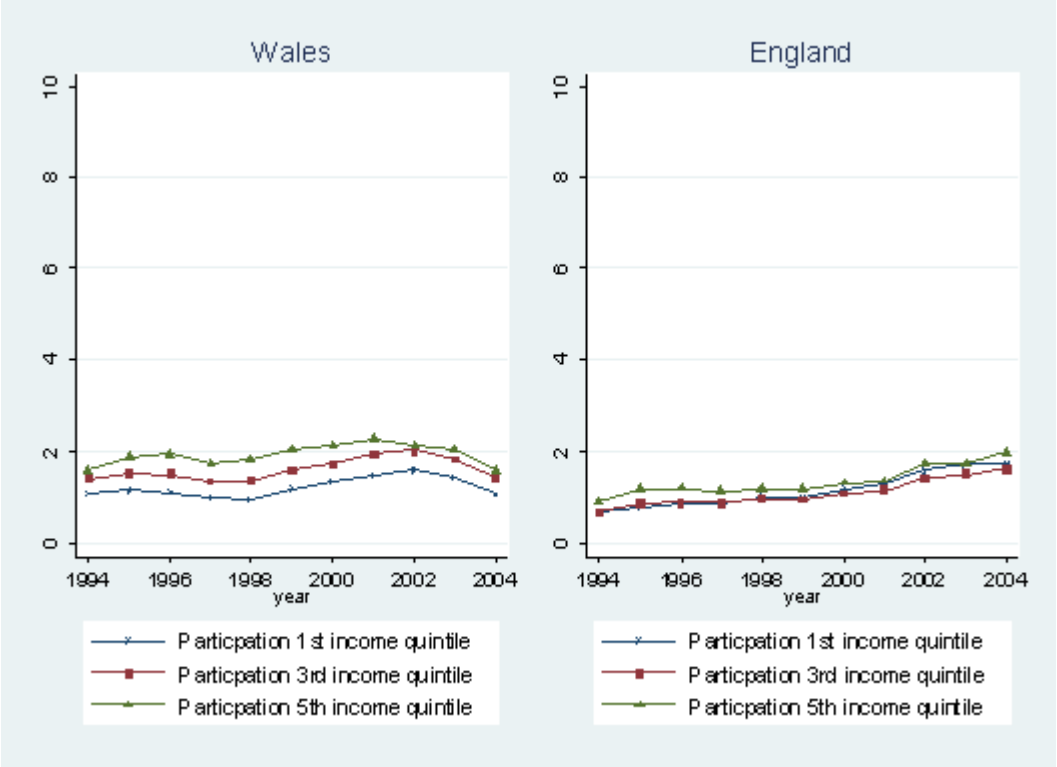
Source: Based on fitted values from fixed effects estimates in Table 3. Regression gives predicted value for natural logarithm of number of full time students enrolled in HE for each postcode. The figure above shows predicted student numbers enrolled in HE as a proportion of the 18-24 age group, for postcodes in the 5th, 3rd and 1st quintiles.

Figure 6: Predicted number of students as a proportion of the 18-24 age group
for part-time students by country and year



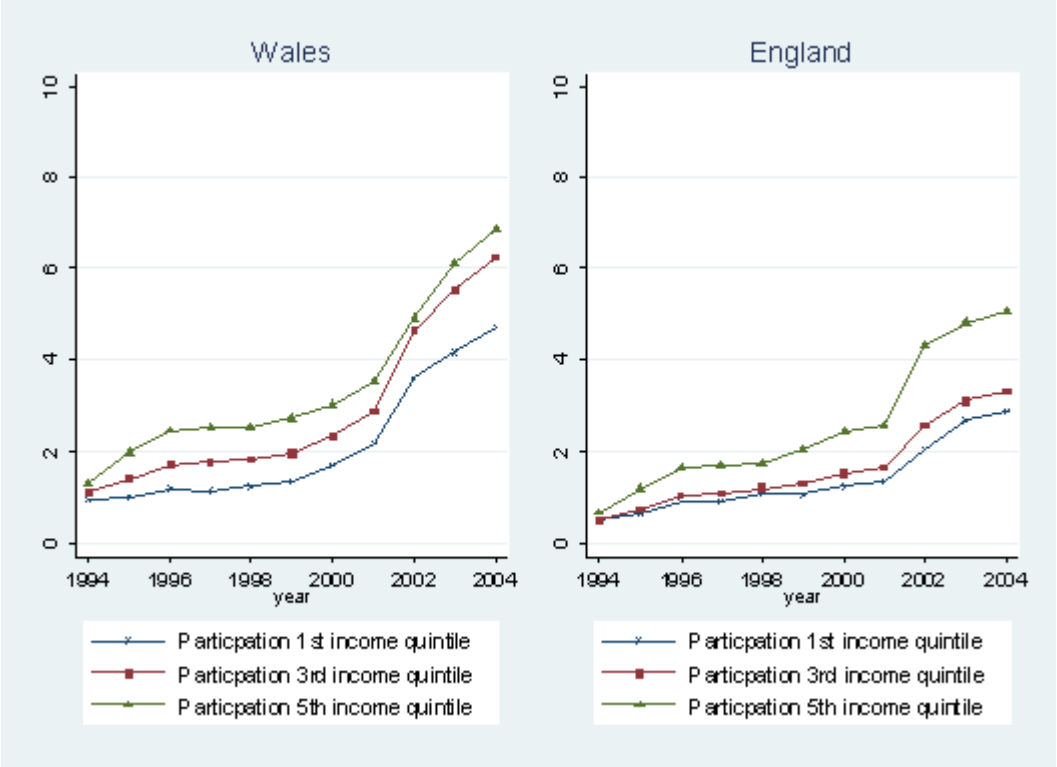
Source: Based on fitted values from fixed effects estimates in Table 4. Regression gives predicted value for natural logarithm of number of part time students enrolled in HE for each postcode. The figure above shows predicted student numbers enrolled in HE as a proportion of the 18-24 age group, for postcodes in the 5th, 3rd and 1st quintiles.

Figure 7: Predicted number of students as a proportion of the 18-24 age group
for sub-degree full time students by country and year



Source: Based on fitted values from fixed effects estimates in Table 6. Regression gives predicted value for natural logarithm of number of sub-degree full time students enrolled in HE for each postcode. The figure above shows predicted student numbers enrolled in HE as a proportion of the 18-24 age group, for postcodes in the 5th, 3rd and 1st quintiles.

Figure 8: Predicted number of students as a proportion of the 18-24 age group
for sub-degree part-time students by country and year



Source: Based on fitted values from OLS estimates in Table 7. Regression gives predicted value for natural logarithm of number of sub-degree part time students enrolled in HE for each postcode. The figure above shows predicted student numbers enrolled in HE as a proportion of the 18-24 age group, for postcodes in the 5th, 3rd and 1st quintiles.

Table 1: Total students (Degree, Ph students and Sub-degree students)

	OLS		Fixed Effects	
	Wales	**England**	**Wales**	**England**
Ln (Income)	1.835	1.199	-	-
	(10.41)***	(35.31)***		
Interaction Ln (Income)*year 1995	-0.023	0.098	-0.039	0.105
	(0.09)	(2.04)**	(0.47)	(5.57)***
Interaction Ln (Income)*year 1996	0.049	0.147	0.028	0.164
	(0.20)	(3.07)***	(0.34)	(8.69)***
Interaction Ln (Income)*year 1997	0.123	0.118	0.102	0.150
	(0.50)	(2.46)**	(1.24)	(7.94)***
Interaction Ln (Income)*year 1998	0.173	0.061	0.152	0.090
	(0.70)	(1.29)	(1.85)*	(4.79)***
Interaction Ln (Income)*year 1999	0.160	0.129	0.139	0.161
	(0.65)	(2.70)***	(1.69)*	(8.58)***
Interaction Ln (Income)*year 2000	0.095	0.085	0.074	0.122
	(0.38)	(1.78)*	(0.90)	(6.47)***
Interaction Ln (Income)*year 2001	-0.044	0.043	-0.065	0.082
	(0.18)	(0.90)	(0.80)	(4.34)***
Interaction Ln (Income)*year 2002	-0.313	0.031	-0.319	0.080
	(1.25)	(0.66)	(3.85)***	(4.25)***
Interaction Ln (Income)*year 2003	-0.312	-0.032	-0.285	0.001
	(1.25)	(0.67)	(3.42)***	(0.07)
Interaction Ln (Income)*year 2004	-0.377	-0.056	-0.363	-0.024
	(1.50)	(1.16)	(4.33)***	(1.29)
Population aged 18-24 from Census (in thousands)	1.279	0.907	-	-
	(55.67)***	(167.42)***		
Year dummies	✓	✓	✓	✓
Constant	-2.165	-0.268	3.782	3.900
	(4.17)***	(2.57)**	(409.46)***	(1125.58)***
Observations	5396	74768	5396	74768
Number of postcodes			493	6891
R-squared	0.50	0.42	0.73	0.60

Table 2: Degree students

	OLS		Fixed Effects	
	Wales	**England**	**Wales**	**England**
Ln (Income)	2.142	1.308	-	-
	(11.88)***	(36.44)***		
Interaction Ln (Income)*year 1995	-0.170	0.044	-0.184	0.059
	(0.67)	(0.87)	(2.04)**	(3.11)***
Interaction Ln (Income)*year 1996	-0.082	0.099	-0.118	0.111
	(0.33)	(1.96)*	(1.30)	(5.86)***
Interaction Ln (Income)*year 1997	-0.023	0.073	-0.058	0.105
	(0.09)	(1.45)	(0.64)	(5.54)***
Interaction Ln (Income)*year 1998	-0.037	0.053	-0.074	0.083
	(0.14)	(1.05)	(0.82)	(4.36)***
Interaction Ln (Income)*year 1999	-0.000	0.094	-0.036	0.143
	(0.00)	(1.87)*	(0.40)	(7.53)***
Interaction Ln (Income)*year 2000	-0.118	0.048	-0.095	0.104
	(0.46)	(0.96)	(1.05)	(5.50)***
Interaction Ln (Income)*year 2001	-0.062	0.041	-0.097	0.083
	(0.24)	(0.83)	(1.07)	(4.36)***
Interaction Ln (Income)*year 2002	-0.431	0.006	-0.451	0.054
	(1.69)*	(0.13)	(4.93)***	(2.86)***
Interaction Ln (Income)*year 2003	-0.496	-0.030	-0.484	-0.004
	(1.94)*	(0.59)	(5.27)***	(0.22)
Interaction Ln (Income)*year 2004	-0.545	-0.077	-0.548	-0.036
	(2.12)**	(1.53)	(5.94)***	(1.89)*
Population aged 18-24 from Census (in thousands)	1.168	0.837	-	-
	(49.72)***	(147.37)***		
Year dummies	✓	✓	✓	✓
Constant	-3.597	-0.964	3.200	3.488
	(6.78)***	(8.74)***	(313.67)***	(1003.58)***
Observations	5391	74552	5391	74552
Number of postcodes			493	6890
R-squared	0.47	0.37	0.69	0.55

Table 3: Full time students

	OLS		Fixed Effects	
	Wales	**England**	**Wales**	**England**
Ln (Income)	1.854	1.260	-	-
	(10.47)***	(35.89)***		
Interaction Ln (Income)*year 1995	-0.050	0.019	-0.083	0.051
	(0.20)	(0.37)	(1.00)	(2.69)***
Interaction Ln (Income)*year 1996	0.018	0.091	-0.016	0.135
	(0.07)	(1.85)*	(0.19)	(7.12)***
Interaction Ln (Income)*year 1997	0.129	0.060	0.091	0.114
	(0.52)	(1.23)	(1.09)	(6.02)***
Interaction Ln (Income)*year 1998	0.161	0.042	0.123	0.094
	(0.65)	(0.86)	(1.47)	(4.98)***
Interaction Ln (Income)*year 1999	0.220	0.094	0.182	0.142
	(0.89)	(1.91)*	(2.18)**	(7.53)***
Interaction Ln (Income)*year 2000	0.177	0.060	0.139	0.106
	(0.71)	(1.21)	(1.66)*	(5.61)***
Interaction Ln (Income)*year 2001	0.102	0.015	0.064	0.079
	(0.41)	(0.31)	(0.77)	(4.16)***
Interaction Ln (Income)*year 2002	-0.181	0.011	-0.205	0.084
	(0.72)	(0.23)	(2.43)**	(4.41)***
Interaction Ln (Income)*year 2003	-0.172	-0.022	-0.162	0.027
	(0.68)	(0.44)	(1.92)*	(1.42)
Interaction Ln (Income)*year 2004	-0.224	-0.054	-0.228	0.015
	(0.89)	(1.10)	(2.67)***	(0.77)
Population aged 18-24 from Census (in thousands)	1.206	0.866	-	-
	(52.27)***	(155.44)***		
Year dummies	✓	✓	✓	✓
Constant	-2.465	-0.695	3.501	3.630
	(4.73)***	(6.44)***	(371.73)***	(1045.38)***
Observations	5393	74625	5393	74625
Number of postcodes			493	6890
R-squared	0.46	0.38	0.63	0.52

Table 4: Part time students

	OLS		Fixed Effects	
	Wales	**England**	**Wales**	**England**
Ln (Income)	1.482	1.144	-	-
	(7.59)***	(32.71)***		
Interaction Ln (Income)*year 1995	0.166	0.166	0.164	0.176
	(0.61)	(3.39)***	(1.27)	(7.48)***
Interaction Ln (Income)*year 1996	0.316	0.115	0.237	0.151
	(1.15)	(2.34)**	(1.83)*	(6.42)***
Interaction Ln (Income)*year 1997	0.514	0.133	0.444	0.170
	(1.89)*	(2.72)***	(3.44)***	(7.22)***
Interaction Ln (Income)*year 1998	0.346	0.001	0.336	0.012
	(1.27)	(0.02)	(2.61)***	(0.51)
Interaction Ln (Income)*year 1999	0.482	0.094	0.326	0.124
	(1.78)*	(1.94)*	(2.54)**	(5.31)***
Interaction Ln (Income)*year 2000	0.126	0.019	0.057	0.069
	(0.46)	(0.39)	(0.44)	(2.93)***
Interaction Ln (Income)*year 2001	0.076	-0.004	-0.060	0.029
	(0.28)	(0.09)	(0.47)	(1.25)
Interaction Ln (Income)*year 2002	-0.299	-0.004	-0.349	0.023
	(1.09)	(0.08)	(2.69)***	(0.98)
Interaction Ln (Income)*year 2003	-0.210	-0.076	-0.246	-0.071
	(0.77)	(1.56)	(1.89)*	(3.03)***
Interaction Ln (Income)*year 2004	-0.282	-0.120	-0.333	-0.129
	(1.03)	(2.47)**	(2.55)**	(5.53)***
Population aged 18-24 from Census (in thousands)	1.413	0.963	-	-
	(56.65)***	(177.00)***		
Year dummies	✓	✓	✓	✓
Constant	-2.573	-1.607	2.391	2.418
	(4.47)***	(14.95)***	(165.77)***	(566.25)***
Observations	5334	74151	5334	74151
Number of postcodes			493	6890
R-squared	0.53	0.48	0.71	0.66

Table 5: Degree Full and Part time students

	Full time				Part time			
	OLS		Fixed Effects		OLS		Fixed Effects	
	Wales	England	Wales	England	Wales	England	Wales	England
Ln (Income)	2.163	1.371	-	-	1.181	0.477	-	-
	(11.93)***	(37.87)***			(5.25)***	(11.55)***		
Interaction Ln (Income)*year 1995	-0.175	0.024	-0.190	0.045	0.103	-0.056	0.063	0.020
	(0.69)	(0.46)	(2.04)**	(2.34)**	(0.34)	(0.96)	(0.27)	(0.54)
Interaction Ln (Income)*year 1996	-0.100	0.073	-0.131	0.099	0.032	-0.093	0.050	-0.039
	(0.39)	(1.43)	(1.41)	(5.14)***	(0.10)	(1.61)	(0.21)	(1.06)
Interaction Ln (Income)*year 1997	-0.039	0.043	-0.075	0.084	0.209	-0.023	0.248	0.059
	(0.15)	(0.85)	(0.80)	(4.40)***	(0.69)	(0.40)	(1.05)	(1.62)
Interaction Ln (Income)*year 1998	-0.042	0.066	-0.079	0.094	0.437	-0.040	0.375	-0.022
	(0.16)	(1.30)	(0.85)	(4.92)***	(1.45)	(0.70)	(1.61)	(0.61)
Interaction Ln (Income)*year 1999	0.026	0.102	-0.009	0.150	0.493	-0.051	0.420	-0.014
	(0.10)	(2.01)**	(0.10)	(7.88)***	(1.66)*	(0.91)	(1.82)*	(0.39)
Interaction Ln (Income)*year 2000	-0.088	0.076	-0.064	0.129	0.072	-0.099	0.014	-0.096
	(0.34)	(1.50)	(0.69)	(6.75)***	(0.24)	(1.76)*	(0.06)	(2.69)***
Interaction Ln (Income)*year 2001	-0.001	0.054	-0.036	0.106	-0.289	-0.126	-0.369	-0.128
	(0.00)	(1.06)	(0.39)	(5.57)***	(0.97)	(2.25)**	(1.60)	(3.61)***
Interaction Ln (Income)*year 2002	-0.373	0.035	-0.392	0.086	-0.687	-0.189	-0.783	-0.204
	(1.45)	(0.70)	(4.18)***	(4.47)***	(2.29)**	(3.38)***	(3.37)***	(5.74)***
Interaction Ln (Income)*year 2003	-0.414	0.005	-0.401	0.033	-0.414	0.133	-0.456	0.106
	(1.61)	(0.09)	(4.25)***	(1.73)*	(1.40)	(2.39)**	(1.99)**	(3.01)***
Interaction Ln (Income)*year 2004	-0.458	-0.043	-0.460	0.004	-0.346	0.087	-0.529	0.065
	(1.77)*	(0.84)	(4.85)***	(0.22)	(1.16)	(1.57)	(2.28)**	(1.85)*
Population aged 18-24 from Census (in thousands)	1.154	0.823	-	-	0.880	0.754	-	-
	(48.80)***	(143.74)***			(33.25)***	(124.32)***		
Year dummies	✓	✓	✓	✓	✓	✓	✓	✓
Constant	-3.716	-1.250	3.138	3.388	-3.171	-0.678	0.662	1.178
	(6.96)***	(11.23)***	(299.22)***	(967.75)***	(4.77)***	(5.33)***	(23.97)***	(181.04)***
Observations	5390	74486	5390	74486	4717	69098	4717	69098
Number of postcodes			493	6890			491	6863
R-squared	0.46	0.37	0.65	0.52	0.45	0.33	0.55	0.47

Table 6: Sub-degree Full time students

	OLS		Fixed Effects	
	Wales	**England**	**Wales**	**England**
Ln (Income)	0.402	0.221	-	-
	(1.99)**	(5.78)***		
Interaction Ln (Income)*year 1995	0.158	0.058	0.152	0.110
	(0.56)	(1.08)	(0.82)	(3.18)***
Interaction Ln (Income)*year 1996	0.418	0.053	0.333	0.105
	(1.49)	(0.98)	(1.79)*	(3.03)***
Interaction Ln (Income)*year 1997	0.575	-0.049	0.449	0.010
	(2.04)**	(0.91)	(2.41)**	(0.28)
Interaction Ln (Income)*year 1998	0.618	-0.167	0.639	-0.153
	(2.19)**	(3.16)***	(3.42)***	(4.50)***
Interaction Ln (Income)*year 1999	0.291	-0.189	0.292	-0.177
	(1.03)	(3.56)***	(1.57)	(5.19)***
Interaction Ln (Income)*year 2000	0.277	-0.237	0.178	-0.236
	(0.99)	(4.49)***	(0.96)	(6.95)***
Interaction Ln (Income)*year 2001	0.265	-0.299	0.096	-0.303
	(0.95)	(5.66)***	(0.52)	(8.90)***
Interaction Ln (Income)*year 2002	0.100	-0.293	-0.101	-0.261
	(0.35)	(5.57)***	(0.54)	(7.68)***
Interaction Ln (Income)*year 2003	0.106	-0.336	0.013	-0.323
	(0.37)	(6.38)***	(0.07)	(9.52)***
Interaction Ln (Income)*year 2004	0.363	-0.216	0.197	-0.183
	(1.26)	(4.11)***	(1.04)	(5.41)***
Population aged 18-24 from Census (in thousands)	0.979	0.722	-	-
	(37.67)***	(124.45)***		
Year dummies	✓	✓	✓	✓
Constant	0.191	0.411	1.791	1.478
	(0.32)	(3.50)***	(85.56)***	(240.86)***
Observations	5157	71031	5157	71031
Number of postcodes			493	6862
R-squared	0.24	0.24	0.09	0.24

Table 7: Sub-degree Part time students

	OLS		Fixed Effects	
	Wales	**England**	**Wales**	**England**
Ln (Income)	0.538	0.398	-	-
	(2.38)**	(9.42)***		
Interaction Ln (Income)*year 1995	0.483	0.376	0.645	0.475
	(1.53)	(6.48)***	(3.17)***	(12.92)***
Interaction Ln (Income)*year 1996	0.704	0.295	0.825	0.406
	(2.24)**	(5.09)***	(4.06)***	(11.10)***
Interaction Ln (Income)*year 1997	0.849	0.305	0.922	0.430
	(2.71)***	(5.29)***	(4.55)***	(11.78)***
Interaction Ln (Income)*year 1998	0.566	0.151	0.697	0.222
	(1.80)*	(2.65)***	(3.44)***	(6.16)***
Interaction Ln (Income)*year 1999	0.638	0.424	0.744	0.507
	(2.04)**	(7.42)***	(3.68)***	(14.03)***
Interaction Ln (Income)*year 2000	0.431	0.427	0.485	0.531
	(1.38)	(7.50)***	(2.41)**	(14.73)***
Interaction Ln (Income)*year 2001	0.135	0.425	0.216	0.508
	(0.43)	(7.48)***	(1.07)	(14.13)***
Interaction Ln (Income)*year 2002	-0.162	0.566	-0.118	0.661
	(0.52)	(9.97)***	(0.58)	(18.38)***
Interaction Ln (Income)*year 2003	0.134	0.388	0.139	0.440
	(0.43)	(6.87)***	(0.68)	(12.26)***
Interaction Ln (Income)*year 2004	0.159	0.370	0.120	0.422
	(0.50)	(6.54)***	(0.59)	(11.77)***
Population aged 18-24 from Census (in thousands)	1.266	0.806	-	-
	(44.22)***	(131.78)***		
Year dummies	✓	✓	✓	✓
Constant	-0.517	-0.429	1.611	1.194
	(0.78)	(3.30)***	(70.80)***	(178.76)***
Observations	5204	71158	5204	71158
Number of postcodes	0.45	0.40	493	6883
R-squared	-0.517	-0.429	0.56	0.56

APPENDIX A – FORTHCOMNG IN EMPIRICAL ECONOMICS

Who actually goes to University?[12]

Oscar Marcenaro-Gutierrez[13], Fernando Galindo-Rueda[14], and Anna Vignoles[15]

Centre for the Economics of Education

[12] We are grateful for very helpful comments from two anonymous referees, as well as participants at the CEE seminar on this issue.
[13] University of Malaga and Centre for Economic Performance, London School of Economics, ~~Houghton St. London, WC2A 2AE.~~
[14] Centre for Economic Performance, London School of Economics, Houghton St. London, WC2A 2AE.
[15] Corresponding author a.vignoles@ioe.ac.uk, fax: 44 (0)20 7612 6880, Bedford Group, Institute of Education, University of London, 20 Bedford Way, London WC1H OAL and Centre for the Economics of Education.

ABSTRACT

Access to higher education (HE) is a major policy issue in England and Wales. There is concern that children from lower socio-economic backgrounds are far less likely to get a degree. We analyse the changing association between socio-economic background and the likelihood of going to university, using data from the Youth Cohort Study, spanning the period 1994-2000. We find evidence of substantial social class inequality in HE participation but conclude that this is largely due to education inequalities that emerge earlier in the education system. Conditional on GCSE and A level performance, we find no additional role for socio-economic background or parental education in determining pupils' likelihood of going to university.

JEL: I21, I23, I28

Keywords: higher education, socio-economic gap, education participation.

1. INTRODUCTION

Access to HE is a major policy issue in the England and Wales, and indeed across the UK. There is much concern that students from lower socio-economic backgrounds are substantially less likely to acquire a university degree, as compared to students from more advantaged backgrounds. Recent research has suggested that the problem of socio-economic inequality[16] in HE is long standing, and in fact worsened significantly during the late 1980s and early 1990s[17]. This paper extends this field of research by considering similar issues in the mid and late 1990s[18]. A number of policy changes occurred in the 1990s that caused issues around access to HE to become even more topical. For example, the introduction of up front tuition fees for degree courses in 1998, which raised fears that this might hinder access by poorer students. Despite the fact that poorer students are exempt from fees, there were many who predicted that tuition fees would be more likely to deter poorer students, further widening the socio-economic gap in HE (Callender (2003)). Whilst we are unable to isolate the impact of tuition fees specifically with these data[19], we are able to model the changing association between socio-economic background and HE participation during the 1990s, clearly an important period of policy change in the English and Welsh higher education sectors. Furthermore, we provide evidence on the timing of socio-economic gaps in educational attainment that emerge in the English and Welsh education system. Specifically, we ask whether educational inequalities that are related to family background actually widen in the post A level phase of the English and Welsh education system or whether conditional on attainment at GCSE and A level, family background plays no further role in determining participation in HE. This evidence is therefore very relevant to the debate on the timing of policy interventions and sequential complementarities in educational investments (Carneiro and Heckman 2003).

Blanden and Machin (2003) have investigated in some detail the relationship between parental income and higher education participation. They conclude that the expansion

[16] There are of course many forms of inequality in HE participation, such as inequalities by ethnicity, gender, location or combinations of the above. Here we focus on education inequality, as measured by parental socio-economic group and also parental education level.
[17] Blanden et al. (2002), Galindo-Rueda and Vignoles (2005), Machin and Vignoles (2004)).
[18] Our previous work on this issue specifically examined some elements of the HE participation decision immediately before and after the introduction of tuition fees (Galindo-Rueda, Marcenaro-Gutierrez and Vignoles (2004)). Here we consider a longer time period and analyse a broader range of issues relating to HE participation.

of the education system in the 1970s, through to the early 1990s, was associated with a widening of the gap in HE participation between rich and poor children. Glennerster (2001) also found evidence of a strengthening of the relationship between social class and the HE participation rate in the early 1990s[20]. Using two cohorts of YCS data (from 1996 and 1999) Galindo-Rueda et al (2004) found some widening of the gap in HE participation between students from lower and higher socio-economic backgrounds in the period immediately after the introduction of tuition fees in 1998. In this paper we extend this work, focusing on a longer time period (1994-2000) and modelling the association between a wide range of individual and family background characteristics and HE participation. In particular, we investigate the extent to which the problem of inequality in HE is in fact not rooted in the HE sector itself, but is attributable to inequalities and decisions made earlier in the system.

In addition to the empirical literature mentioned above, this paper relates to a burgeoning economic theoretical literature on educational inequality (e.g. Benabou (1996); De Fraja (forthcoming; 2002); Fernández and Rogerson (1996); Fernández and Rogerson (1998)), as well as the sociological literature on this issue (e.g. Breen and Goldthorpe (1997)). The paper contributes, from an economic perspective, to the growing number of empirical studies that have investigated the relationship between socio-economic background and the likelihood of HE participation in England and Wales. Much of this empirical work, some of which has also used YCS data, has been done in a sociological framework (Jackson et al. (2004); Gayle et al (2003)). The paper also contributes to a broader literature on other sources of inequality in educational attainment, which includes differences by ethnicity, gender and disability (e.g. Bradley and Taylor (2000); Buchardt (2004)).

The next section describes briefly trends in HE participation in England and Wales and recent changes to higher education policy. Section 3 describes our data. Section 4 presents our results and Section 5 concludes.

[19] It is not obvious how one would evaluate the impact of tuition fees in a conventional evaluation framework with existing data.

[20] Erikson and Goldthorpe (1985), Erickson and Goldthorpe (1992), Saunders (1997) and Schoon et al. (2002) have examined issues relating to education and social mobility, to cite just a few.

2. HIGHER EDUCATION PARTICIPATION AND POLICY

Education participation in England and Wales has risen steadily for the last half century (Figure 1)[21], at least as measured by the proportion of students staying on in education past the compulsory school leaving age. Substantial growth in the HE participation rate has been more recent however. In the early 1990s, there was a dramatic increase in the HE participation rate for young people (Figure 1), partly related to the merging of the polytechnic and university sectors at that time. Subsequently HE participation continued to grow in most years but at a lower rate.

- Figure 1 here -

The introduction of tuition fees in 1998[22] and the abolition of maintenance grants in 1999 does not appear to have had a major impact on aggregate HE participation. Figure 2 shows the simple trend of first-degree students (all years including new entrants and full and part-time students)[23], by gender and over time, for England and Wales[24]. A slight stagnation of the upward trend in student numbers is evident following the introduction of tuition fees; the trend then resumes its upward path.

- Figure 2 here -

Although participation has been rising during this period, there is still concern about *who* goes to university, which is the motivation for this paper. Historically access to HE in England and Wales has been predominantly limited to those from higher socio-economic groups. Certainly if one looks at the very top and bottom of the socio-economic scale, the situation is dire. More than three quarters of students from professional backgrounds study for a degree, compared to just 14% of those from unskilled backgrounds. Moreover, this inequality in the HE system has persisted over the last forty years. Descriptive data for the 1990s[25] (Table 1), the period relevant to

[21] Figure 1 is based on the DfES Age Participation Index which measures the proportion of the under 21s in each social class participating in Higher Education for the first time (i.e. young entrants from each social class as a percentage of all young people in each social class).

[22] Prior to 1998, students did not pay for their higher education courses and there was a means tested grant. Tuition fees are currently payable before the course starts by students whose parents earn more than around £30,000pa. Some fee exemption is given for students whose parents earn between approximately £21,000 and £30,000pa. Student loans have replaced the grant system.

[23] This figure is derived using HESA data. Overseas students, those who did not report a domicile postcode, students with missing data on various fields are excluded. Full details of these samples are available from the authors.

[24] The situation is similar in terms of participation in Scotland, despite differences in student funding arrangements between the two sets of countries.

[25] Based on the DfES Age Participation.

our study, suggest a rise in participation by all socio-economic groups and a small widening of the gap in participation rates between richer and poorer students[26].

- Table 1 here -

Further policy developments in HE are on the horizon. In 2004, the UK parliament narrowly passed legislation to make further changes to the funding of higher education. Variable tuition fees have been proposed, i.e. fees that vary both by course and by institution. But perhaps the most important feature of the proposals, from the perspective of widening access, is that fees will be repaid after graduation via an income contingent loan system, and grants will be restored to low-income students. Given these continued policy developments in HE, the socio-economic characteristics of young people who progress into HE continue to be of wider interest.

3. DATA AND METHODOLOGY

The data set we use for our analysis is the Youth Cohort Study (YCS), which is a series of longitudinal surveys conducted by the Department for Education and Skills. The surveys are of a particular academic year group or "cohort", and are carried out by contacting cohort members by post three times, at yearly intervals, when they are aged 16-17, 17-18 and 18-19. Respondents are first surveyed in the year after they are eligible to leave compulsory schooling. They are then followed up, generally over a two-year period[27]. The data collected includes information about the economic status of the young person, and in particular whether they have entered higher education by age 18/19, as well as their educational background, qualifications, family background and other socio-economic indicators. The survey is nationally representative (England and Wales) and the sample size of each cohort is around 20,000 observations. We use cohorts 6-9, i.e. including 4 cohorts of individuals who were aged 18 in 1994, 1996, 1998 and 2000[28].

The YCS has been used extensively as a resource to analyse educational outcomes and subsequent transitions into the labour market (Croxford (2000); Dolton et al. (2001); Gayle et al. (2000; 2002; 2003), Howieson and Payne et al. (1996), Payne

[26] There is a dip in the HE participation rate in 1997/98: the participation rate for both lower and upper socio-economic groups returns to its pre-fees level by 2000.
[27] Some of the early cohorts have since been followed up to age 21 and beyond.
[28] We avoid using earlier cohorts since the abolition of the binary line in 1992 makes over time comparisons of participation trends in the earlier period problematic.

(1996); Rice (1999)). It is not without its faults however. Non-response and attrition are a problem in the YCS, and there has been extensive academic research on this issue (Lynn (1996)). For example, our last cohort (9) started out with an initial target sample size of 22,500. In the first survey at age 16/17, the response rate was 65%. A similar response rate was also achieved in the 17-year-old and 18-year-old surveys. This means that the 18-year-old sample constitutes only 28% of the initial sample (6,304 young people)[29].

The extent of any attrition problem is somewhat minimised by the fact that our preferred model uses a restricted sample of higher achieving students (i.e. those with 5 or more grades A*-C at GCSE), since these are the students who have sufficient prior attainment to be able to proceed to HE (see below for a discussion of this issue and our estimation strategy). Whilst this does not in itself overcome the attrition issue, it is the case that higher achieving students are less likely to attrit from the sample. The characteristics of the restricted sample vary relatively little from sweep to sweep, suggesting that this group is less likely to attrit (see Appendix A for an illustration from Cohort 7). The data are re-weighted for non-response in sweep 1, to bring them in line with population estimates. Nonetheless, to the extent that attrition is not random, and that it differs in both extent and nature across the YCS cohorts, we will still have some bias in our estimates. As a check we compare the unweighted HE participation rate from the YCS with published statistics on national HE participation rates during the period. They are closely aligned. In 1994, 29% of the YCS sample was doing a degree; this compares to an official HE participation rate of 30%[30]. YCS data suggests that the HE participation rate rose to 35% by the end of the period in 2000/01; the DfES' own estimates also suggest a 35% participation rate by 2001/02. Thus despite the limitations of the YCS data mentioned above, we are confident that the data accurately reflect national trends in HE participation at that time.

We estimate the conditional probability of participating in HE using a probit model, pooling all four cohorts. Our choice of explanatory variables is derived from the vast

[29] A table showing the response rates of the various cohorts is given in Appendix A Table 4, with a slight decline in the initial response rate over time.

[30] Official statistics on HE participation rates are from the Department for Education and Skills which calculates participation by young people in Higher Education (i.e. the Age Participation Index (API)) for Great Britain. See website below:
http://www.dfes.gov.uk/trends/index.cfm?fuseaction=home.showChart&cid=4&iid=23&chid=89

literature that focuses on the relationship between family background and child educational outcomes (e.g. Behrman, 1997).

We use a standard probit model such that:

$$P(H = 1 | X) = P(X\beta + \varepsilon > 0) = \Phi(X\beta)$$

where H represents participation in HE (or not) and X is a vector of explanatory variables including the individual's prior attainment, family background and school inputs. ε is normally distributed. Prior attainment in this case is measured at age 16 (GCSE) and as discussed our main model imposes the condition of a minimum of five grade A*-C at GCSE[31]. Family background is measured by parental socio-economic background, parental education and ethnicity[32]. School inputs are proxied by school type. In our basic specifications, we control for mean cohort effects by including cohort dummies.

We acknowledge that our data does not include some variables that have been found to be important in determining educational attainment (Feinstein and Symons (1999)), including neighbourhood context variables[33] and in particular family income[34]. To the extent that we have omitted explanatory variables that are correlated with the variables included in the model, the model will suffer from omitted variable bias. This is a common problem in the literature given that most data sets are not sufficiently rich to control for all the factors that have been found to influence educational attainment. It does however, make causal interpretation of the explanatory variables problematic, a point we return to below.

Another issue is that the explanatory variables are correlated. Parental education level clearly influences parental socio-economic status. Likewise, socio-economic background influences school type, as does ethnicity. For example, ethnic minority students attend schools of worse quality than do students from white households (Cook and Evans, 2000; Fryer and Levitt, 2005). However, we also know these variables have independent effects. Parental education, for example, moderates the

[31] In some specifications we control for prior achievement at age 18 (A level).
[32] We also control for gender.
[33] We can only control for region.

effects of family characteristics on child attainment via parenting style and educational behaviours (Feinstein *et al*, 2004). We therefore include all these measures as independent variables and acknowledge that we are measuring conditional relationships. So, for example, by including school type at age 16, we will tend to reduce the magnitude of the association between socio-economic background and HE participation since socio-economic background may influences educational attainment via type of school attended. As this paper focuses on the additional role of these family background variables in the period after compulsory schooling this is not a major limitation and these conditional relationships are discussed in detail in our results section.

Our basic model therefore measures the relationship between a range of family background measures and HE participation, conditional on a minimum level of GCSE achievement. However, as has been said, we cannot assume that the relationships we observe are necessarily causal. Some of our key explanatory variables, such as parents' socio-economic background, are potentially endogenous. Unmeasured parental characteristics and attitudes towards schooling may well influence both the child's educational achievement and the parent's socio-economic status. Furthermore, we do not have any measures of the individual's inherent ability in the data set. If pupils' ability is correlated with their socio-economic background, some of the apparent positive impact of family background on HE participation is actually attributable to such pupils being of higher ability[35]. We cannot completely overcome these problems in our data. Although we do have measures of educational achievement at age 16, these are also potentially endogenous. We did explore the data extensively to try to find potential instruments for these age 16 measures of achievement; however we were unable to find any suitable variables in the data set. Instead, we use the age 16 measures of educational achievement to observe whether family background largely works through decisions made at or prior to age 18. We are already testing this to some extent by focusing on a sample of students who achieved a minimum of 5 good GCSEs at age 16. We test this argument further however, by including other measures of prior attainment (A levels attained and GCSE grades), to determine whether the marginal association between family background and HE

[34] Family income can affect child attainment through its impact on the resources spent on the child's development and through its influence on parental behaviours and practices (e.g. Brooks-Gunn and Duncan, 1997).

[35] The model may also suffer from other sources of omitted variables bias. For example, it does not include parental income measures as these are not available in the data.

participation becomes less important once these prior attainment variables are included. Of course students who anticipate that they will go on to university may work harder at GCSE and A level. That is why these measures are potentially endogenous. However, the data can at least tell us at whether family background acts on decisions and achievement at age 16 and 18, rather than at the point of entry into HE.

We allow for mean changes in HE participation over time with our cohort dummy variables, with the base case being cohort 6 (potentially entering HE in 1994). We then test for changes in the marginal associations between the explanatory variables and the HE participation decision by including interactions between the cohort dummy variables and other explanatory variables, as described in more detail below.

4. RESULTS

4.1 Descriptive Statistics

Descriptive statistics for the full YCS sample are shown in Table 2. The first columns describe the samples participating in higher education and not participating in HE for the cohorts aged 18 in 1994. Of those aged 18 in 1994, 29% were in higher education. The third column gives the total proportion of the 1994 cohort with each characteristic. The subsequent sets of columns provide the same information for the cohorts aged 18 in 1996, 1998 and 2000.

- Table 2 here -

Even over this relatively short period of time, there appears to have been some changes in the characteristics of those participating in higher education. Of those participating in HE in 1994, 36% were from a professional, managerial or technical background. By 2000, this had risen to 38%. Similar trends can be observed when we consider parental education. 29% of those participating in HE in 1994 had a father with a degree: by 2000 this had risen to 32%, and a similar trend is observed for the proportion of students whose mother had a degree. Some of this change is due to a change in the overall characteristics of the sample (e.g. the proportion of the total sample with a degree educated father rose from 17% to 21% over the period).

This was also a period during which GCSE and A level achievement was rising substantially. Whilst 67% of those participating in HE in 1994 had 3 or more A levels,

this proportion had risen to 72% for those in HE in 2000. This trend reflects both rising A level achievement across the board, and potentially a change in the composition of the HE student body.

4.2 Regression results

Table 3 gives the marginal effects from a probit model, where the dependent variable takes a value of one if the person was in higher education at age 18 and zero if they were not[36]. Individuals not participating in HE could be in various states, either in or out of the labour market, or studying for lower level qualifications. Data from the 4 cohorts are pooled. The sample for our main table, as discussed above, is restricted to those who we believe are potentially able and qualified to go on to HE, i.e. those with five or more Grade A*-C GCSEs. In addition to addressing some of the attrition issues discussed in the previous section, restricting our sample to those with five or more good GCSEs would appear to be appropriate since increasingly individuals enter HE without A levels and hence limiting the sample to only those with A levels is too restrictive. However, our results remain qualitatively similar even when the comparator group is all individuals with one or more A levels.

In specifications 1 to 3 in Table 3, dummy variables are included which indicate which cohort the individual is from, with the base case being cohort 6 (age 18 in 1994). The cohort dummy variables measure the average difference in HE participation between earlier and later cohorts, conditional on other personal characteristics of the students. Our other explanatory variables as discussed earlier are the student's gender, socio-economic background, ethnicity, parental education and school type. Specification 1 in Table 3 does not control for age 16/18 achievement (beyond the restriction of the sample to those with 5 good GCSEs). This model therefore measures the marginal association between these family background and school measures and HE participation, conditional on a minimum level of GCSE attainment. In specification 2 we add in achievement at age 16, measured by GCSE grades in English and mathematics[37]. In specification 3 we add in achievement at age 18, as measured by the number of A levels the student attained. Despite the potential endogeneity of these achievement measures (as discussed above), we can still use

[36] Thus, we are measuring HE participation not degree attainment. If drop out and degree failure vary by social class, we may be understating the extent of the relationship between social class and HE achievement.

[37] Coded as Grade A – 5 points, Grade B – 4 points, Grade C – 3 points, Grade D – 2 points, Grade E – 1 point. Otherwise zero.

these specifications to identify whether there remains any marginal association between our explanatory variables and HE participation, once account has been taken of age 16 and age 18 achievement levels.

In columns 4-6, we then include the interactions between the cohort dummy variables and the variables measuring the individual's socio-economic background[38]. These interaction terms enable us to test the hypothesis that the marginal association between socio-economic background and HE participation has been changing over the period. We are most interested in the gap in HE participation between students of higher (lower) socio-economic backgrounds. We want to determine whether these gaps have changed across the different cohorts. The coefficients on the cohort*socio-economic group interaction terms indicate whether the particular group in question has an increased/decreased probability of HE participation, over and above the average gap in HE participation for that socio-economic group across all cohorts.

Turning to our findings, we start by discussing the average relationship between socio-economic background and HE participation across all cohorts. In specification 1, which does not control for cohort/socio-economic group interactions, nor for GCSE grades or A level attainment, we find a strong and significant relationship between socio-economic background and HE participation. Young people from a professional, managerial or non-manual family background had a 6-percentage point greater probability of being enrolled in HE, as compared to the base case of a student from a skilled manual background. The other socio-economic group variables are insignificant. Recall that this is a marginal association, controlling for other factors that are also influenced by socio-economic background such as school type.

Specifications 2 and 3 in Table 3 then add controls for achievement at both GCSE (specification 2) and A level (specification 3). Inclusion of GCSE achievement reduces but does not eliminate the significant association between socio-economic background and HE participation. However, once one includes a measure of educational achievement at A level, we find that the socio-economic group variables become insignificant.

[38] We tested for full interactions between all the explanatory variables and the cohort dummies but as the other interactions were not included.

Specifications 1-3 constrain the coefficients on the socio-economic group variables to be the same across all the cohorts and only controls for a mean cohort effect. The mean cohort effect in specification 1 suggests that individuals from the later cohorts were between 2 and 3 percentage points less likely to participate in HE, as compared to those from the 1994 cohort. However, when controls for age 16/18 achievement are included in the model (specifications 2 and 3), the mean cohort effect suggests that pupils from the post fee cohorts (1998 and 2000) are nearly 5 percentage points *less* likely to go to university than pupils from the earlier cohorts (1994 and 1996). In other words, in a model which accounts for changes in GCSE and A level achievement, later cohorts are significantly less likely to go to university.

In summary, the first three specifications from Table 3 suggest that, for a given level of achievement at 16 and 18, there is no significant marginal relationship between socio-economic background and HE participation. As we discuss in detail in our conclusions, this is an important finding from a policy perspective, implying that the issue of educational inequality in HE participation is rooted in the decisions made and achievement of pupils in secondary school, rather than at the point of entry into HE.

4.3 Cohort Interactions

As has been said, the first three specifications in Table 3 constrain the impact of the family background variables to be the same across all the cohorts. In specifications 4 to 6 we check this assumption by including a full set of cohort*socio-economic background interactions.

In specification 4, which does not control for GCSE grades or A level attainment, we continue to find significant average relationships between socio-economic background and the likelihood of HE participation. Among students who achieved the minimum of 5 good GCSEs, those from professional backgrounds were 6 percentage points more likely to subsequently participate in HE. Similarly, those from non-manual backgrounds were 4 percentage points more likely to go to university. Once one controls for cohort*socio-economic group interactions, individuals from semi-skilled backgrounds were nearly 6 percentage points less likely to go to university than those from skilled backgrounds, whilst those from unclassified socio-economic backgrounds were 7 percentage points less likely to go to university.

The cohort dummy variables in specification 4 suggest that individuals from the 1998 and 2000 cohorts are between 5-6 percentage points less likely to go to university. Once again this suggests that after controlling for personal characteristics, we find that later cohorts are significantly less likely to go to university.

The cohort*socio-economic group interaction terms in specification 4 are largely insignificant. There is evidence that pupils from cohort 8 (age 18 in 1998) with a non-manual background were 6 percentage points more likely to go to university, as compared to those from a skilled background who turned aged eighteen in 1994. If we focus on the HE participation gap between pupils from non-manual and skilled backgrounds, we find this gap to be 10.4 percentage points in 1998[39], compared to just 4.3 percentage points in 1994. This pattern is not significant for the 2000 cohort however. Equally we find that pupils from a semi skilled background were actually 7.5 percentage points more likely to participate in HE in 1998 (cohort 8). This means that the gap in HE participation between pupils from a semi skilled background and a skilled background was actually +1.8 percentage points for that cohort[40]. This is somewhat counterintuitive, implying individuals from a lower socio-economic background in 1998 were actually more likely to go to university than those from a skilled manual background. By and large however, there is little evidence of a widening socio-economic gap in HE participation over the full period.

Specification 5 then controls for GCSE achievement, whilst specification 6 controls for A level achievement. Controlling for age 16/18 achievement removes any mean association between socio-economic background and HE participation. Controlling for age 16/18 achievement does not however have much impact on the mean cohort effects. The results still suggest that pupils from the 1998 and 2000 cohorts are significantly less likely to go to university than similarly qualified students from earlier cohorts. The socio-economic group – cohort interaction terms remain insignificant, indicating no change in the relationship between socio-economic background and HE participation, at least not once one controls for prior achievement.

In summary, there is a significant relationship between socio-economic background and HE participation when one controls only for a minimal level of GCSE

[39] One must add the coefficient on the non-manual socio-economic group dummy to the coefficient on the non-manual*cohort 8 interaction term (4.3+6.1=10.4).
[40] One must add the coefficient on the semi skilled manual socio-economic group dummy to the coefficient on the semi-skilled*cohort 8 interaction term (-5.7+7.5=1.8).

achievement. In the 1990s, students from more advantaged backgrounds who got 5 good GCSEs were significantly more likely to go on to university than similarly qualified students from lower socio-economic backgrounds. However, once one accounts for achievement at GCSE and particularly at A level, the relationship between socio-economic background and HE participation becomes insignificant. Of course socio-economic background impacts on GCSE and A level achievement too. It is certainly the case that socio-economic background affects students' educational attainment; however, we do not observe a significant relationship between socio-economic background and educational achievement in the A level to HE phase[41].

Secondly, we find that individuals from the 1998 and 2000 (post-fee) cohorts are significantly less likely to go to university for a given set of personal characteristics. However, aggregate HE participation did rise somewhat during this period and as Appendix A Table 6 shows (specification 1), pupils from the later cohorts are indeed significantly more likely to go to university when one does not control for GCSE or A level achievement at all. This apparent contradiction is explained by the fact that GCSE and A level achievement was also rising, so on average potential HE entrants were becoming better qualified. The model actually tests whether, for a given level of achievement at age 16 and 18, individuals from later cohorts were more or less likely to go to university. The results suggest that students who achieved a similar level of achievement at age 16/18 were actually less likely to go to university in the later cohorts. This is consistent with the continuing increase in HE participation during this period being driven by pupils achieving more at GCSE and A level and hence being more likely to go to university, rather than any tendency for the HE participation rate to rise for a given level of attainment. In other words this provides some evidence to counter the 'dumbing down' story, namely that the rise in HE participation has been driven by falling entry standards. It does not provide evidence of any changes in academic standards at GCSE or A level. Furthermore, as HE expanded during the 1980s and early 1990s, increasingly individuals started to enter HE without A levels. This in itself may provide some support for the 'dumbing down' hypothesis in the earlier period.

[41] Appendix A table 6 shows the raw relationship between socio-economic background and the likelihood of attending HE, for the full YCS sample. Specifications 1 and 4 have no controls for educational attainment at age 16 or 18 and show strongly significant effects from socio-economic background on HE participation. The table based on the full sample also confirms that once one allows for achievement at age 16/18, there is no significant relationship between socio-economic background and HE participation. In general terms the appendix shows that most of the relationships observed in the restricted sample also hold in the full sample.

Thirdly, we find weak evidence of a change in the relationship between socio-economic background and HE participation but only for certain socio-economic groups in the 1998 cohort. Clearly the fact that we only find evidence of change for one cohort indicates that such analyses need to be conducted over a reasonably long time period (as is the case here) to identify trends. In any case, these interaction effects disappear once one allows for age 16/18 achievement.

4.4 Other Family Background Variables

We now turn to the other family background and school variables. For the sample of higher achievers in Table 3, i.e. those with 5 or more good GCSEs, males are more likely to participate in HE. In the specifications that control for age 16/18 achievement, this effect is larger. This confirms that for a given level of achievement at age 16/18, boys are still more likely to go to university.

The coefficients on the ethnicity variables are generally insignificant[42]. However, we do observe that Asian students are significantly more likely (by 17-19 percentage points) to go to university. This result is extremely robust to specification and holds in the full sample (Appendix A: Table 6)[43]. There is a large literature on the impact of ethnicity on educational attainment (see Bhattacharyya et al. 2003 for a summary). Our results are broadly consistent with the findings from this literature, namely that whilst ethnicity has a significant impact on educational achievement, much of this is due to the role of socio-economic factors. In models that do not control for socio-economic background, ethnicity plays a significant role in determining educational achievement. In our model, which includes socio-economic group controls, ethnicity only has a significant (positive) effect for students classified as Asian.

Parental education, like socio-economic background, is significantly associated with HE participation. In specification 1, individuals whose mother or father has a degree are 6-9 percentage points more likely to participate in HE[44]. Those with a mother or father with at least one A level are 4-5 percentage points more likely to participate in

[42] Ideally we would have liked finer distinctions between different ethnic groups, rather than the somewhat crude indicators that we use. However, this was not possible with these data.
[43] We also included ethnicity cohort interactions but they were insignificant.
[44] For the full sample model in Appendix B, the relationship between parental education and HE participation is much stronger, as one expect.

HE[45]. Yet once one controls for attainment at age 16 and 18, the effect lessens and becomes insignificant in specification 3, except for pupils who have a degree educated father who are still 3 percentage points more likely to go to university ceteris paribus. The main result is that parental education matters but again the marginal association between parental education and pupils' own educational achievement is largely insignificant in the A level-HE phase[46].

We also included school type, to proxy for an individual's prior school quality and to some extent pupil ability (more able pupils attend grammars). The base case for Table 3 is an individual who attended a comprehensive that took students up to the age of 18. We then examine the relationship between school type and HE participation, where the different school types are; comprehensives that only took students up to the age of 16, grammars, secondary moderns and independent schools. In specification 1, it is clear that students who attended a comprehensive that only went to the age of 16 are significantly less likely to go to university (by around 4 percentage points). Students who were in grammar schools and independent schools are significantly more likely to go to university (by 9 percentage points). Students from secondary moderns are very much less likely (by 13 percentage points) to go to university. This specification does not however, control for achievement at age 16-18 which is highly correlated with school type. In specification 3, after controlling for achievement at both GCSE and A level, an individual who attended an age 16 comprehensive school is still 3 percentage points less likely to go to university. This might suggest that curriculum options, career options, career advice or expectations are different for students attending these schools, even for a given level of pupil ability. Interestingly grammar students are actually 3 percentage points less likely to go to university, for a given level of GCSE and A level attainment[47].

Of course our variables measuring achievement at age 16 and 18, namely the number of A levels and GCSE maths and English grade are highly significant. Higher achieving students are more likely to go to university, for a given set of family background characteristics.

[45] Unsurprisingly the relationship between parental education and HE participation is much stronger in the full sample when no account is taken of GCSE or A level achievement (Appendix A: table 6, specification 1).
[46] We also included parental education cohort interactions but they were insignificant.
[47] We also included school cohort interactions but they were insignificant.

Lastly, we note that our results are robust to the inclusion of regional fixed effects. Our sample size is not sufficient to estimate the model by region but we are aware of recent evidence of regional differences in the determinants of education participation (Rice (2004)).

5. CONCLUSIONS

There is a highly significant relationship between a pupil's socio-economic background and the likelihood of her/him participating in HE. However, we found no evidence of any marginal effect from socio-economic background for a given level of age 16/18 achievement. Thus there is certainly socio-economic inequality in higher education but this phenomenon is largely as a result of inequalities and decisions made earlier in the education system, i.e. before the age of 16/18. Specifically in models that include finer measures of educational achievement at ages 16 and 18, the relationship between socio-economic background and indeed parental education and HE participation becomes statistically insignificant. If policy-makers wish to reduce socio-economic inequalities in higher education, they need to focus first on the problems of educational inequality that emerge in the compulsory schooling phase. This evidence is consistent with other analyses, which suggest that education inequalities emerge early. For example, Bradley and Taylor (2000) found that ethnic differences in educational attainment at age 16 were also largely determined by prior attainment.

Of course just because we observe significant inequalities in educational attainment at earlier ages, does not mean this inequality is unrelated to problems in HE. Students may look forward and anticipate barriers to participation in HE and make less effort in school as a result. Indeed there are many such potential barriers, not least of which is the expected cost of HE and the role of student expectations (see for example Connor et al. (2001); Jackson et al. (2004)). Thus poorer students may put in less effort at school, particularly at GCSE, simply because they do not anticipate being able to access higher education anyway. The role played by students' perceptions about the barriers they face in HE is an area that requires further research. Nonetheless, given that both GCSEs and A levels earn a significant return in the labour market in and of themselves, it is unlikely that students' expectations about not being able to go to

university completely explain their achievement at age 16 or 18. It is more likely that students, who experience a lower quality educational experience up to the age of 16, are less likely to go to university simply because they lack the necessary educational grounding and qualifications to do so.

This paper also examines the *changing* role of family background during the period. Although this is an important period, which saw the introduction of tuition fees, the numerous other policy changes occurring in the HE sector at that time mean that we cannot evaluate the impact of tuition fees per se. Instead we investigated changes in the socio-economic characteristics of those who went to university during this period. We found weak evidence of a change in the relationship between socio-economic background and HE participation for the 1998 cohort. However, over the full period of 1994-2000 there is no consistent evidence of a widening in the HE participation gap between higher and lower socio-economic groups. We therefore conclude that for students who achieve a minimum level at GCSE and A level, there is no evidence of a significant strengthening of the relationship between family background and HE participation during this time.

We did find some evidence that the expansion of HE in the latter half of the 1990s was largely driven by increases in age 16 and age 18 achievement, rather than an opening up of HE to those who lacked these qualifications. GCSE and A level achievement was rising during this period, so on average students were becoming better qualified. In fact we found that students who achieved a similar level of achievement at age 16/18 were actually less likely to go to university in the later cohorts. This suggests that the continuing increase in HE participation during this period is driven by pupils achieving more at GCSE and A level and hence being more likely to go to university, rather than any tendency to 'dumb down' standards and admit lesser qualified students. Of course it may be that standards at 16 and 18 changed during this period and, as discussed above, that any 'dumbing down' in occurred earlier during the massive expansion of HE in the early 1990s.

Lastly, we found a significant relationship between the type of secondary school a pupil attended and their likelihood of going to university, even allowing for the full range of personal characteristics, socio-economic background and academic achievement at age 16/18. Specifically, if a pupil attended a comprehensive without a sixth form, s/he were 3 percentage points less likely to go to university. This might

suggest that curriculum options or expectations are different for students attending these schools, and is an issue that merits further research. Interestingly grammar students are actually less likely to go to university, for a given level of GCSE and A level attainment. We have no hard evidence to explain this result although it may be that grammar school students have greater outside opportunities in the labour market that encourage them to leave full time education. It may also be that grammar school students are more likely to take time out (gap years and the like) before going on to university and that we are unable to observe this in our data.

6. References

Barr N and Crawford I (1998) The Dearing Report and the Government Response: A Critique. Political Quarterly 69 (1): 72-84

Barr N (2002) Funding Higher Education: Policies for Access and Quality. House of Commons Education and Skills Committee, Post-16 student support, Session 2001-02, 24 April 2002

Behrman J (1997) Mother's Schooling and Child Education: A Survey. University of Pennsylvania Department of Economics, Discussion Paper 025, manuscript

Bhattacharyya G, Ison L and Blair M (2003) Minority Ethnic Attainment and Participation in Education and Training: the evidence. Department for Education and Skills Research Report 01-03

Blanden J and Machin S (2003) Educational Inequality and the Expansion of UK Higher Education. Centre for Economic Performance mimeo

Blanden J, Gregg P and Machin S (2003) Changes in Educational Inequality. Centre for the Economics of Education Discussion Paper, Forthcoming

Blanden J, Goodman A, Gregg P and Machin, S (2002) Changes in Intergenerational Mobility in Britain. Centre for the Economics of Education Discussion Paper No. 26, London School of Economics, Forthcoming. In: Corak M (ed.) Generational Income Mobility in North America and Europe. Cambridge University Press, Cambridge

Bradley S and Taylor J (2004) Ethnicity, Educational Attainment and the Transition from School. Manchester School 72 (3): 317-346

Breen R and Goldthorpe J (1997) Explaining Educational Differentials – Towards A Formal Rational Action Theory. Rationality and Society 9: 275-305

Breen R and Goldthorpe J (1999) Class Inequality and Meritocracy: A Critique of Saunders and an Alternative Analysis. British Journal of Sociology 50 (1): 1-27

Brooks-Gunn J, Duncan GJ, and Mariato N (1997) Poor Families, Poor Outcomes: The Well-Being of Children and Youth. In: Duncan GJ and Brooks-Gunn J (eds.), Consequences of Growing Up Poor . Russell Sage Foundation, New York, pp. 1-17

Buchardt T (2004) Aiming high: the educational and occupational aspirations of young disabled people. Support for Learning 19 (4): 181-186

Callender C (2003) Student Financial Support in Higher Education: Access and Exclusion. In: Tight M (ed.) Access and Exclusion: International Perspectives on Higher Education Research. Elsevier Science, London: pp. 127-158

Cameron S and Heckman J (2001) The Dynamics of Educational Attainment of Black, Hispanic and White Males. Journal of Political Economy (109): 455-499

Carneiro, P and Heckman, J (2003) Human Capital Policy. In: Heckman J and Krueger A (eds.) Inequality in America: What Role for Human Capital Policies? MIT Press, Cambridge, MA: pp. 79-90

Chevalier A and Lanot G (2006) Financial Transfer and Educational Achievement. Education Economics, Forthcoming

Connor H, Dewson S, Tyers C, Eccles J and Aston J (2001) Social Class and Higher Education: Issues Affecting Decisions on Participation by Lower Social Class Groups. Department for Education and Skills Research Report RR267

Cook M and Evans W (2000) Families or Schools? Explaining the Convergence in White and Black Academic Performance. Journal of Labor Economics 18 **(**4): 729-754

Currie J and Thomas D (1999) Early Test Scores, Socioeconomic Status and Future Outcomes. NBER Working Paper No. 6943. National Bureau of Economic Research: Cambridge, MA

Dearden L, Machin S and Reed H (1997) Intergenerational Mobility in Britain. Economic Journal 107: 47-64

Dearden L, McIntosh S, Myck M and Vignoles A (2002) The Returns to Academic, Vocational and Basic Skills in Britain. Bulletin of Economic Research 54 (3): 249-274

De Fraja G (2005) Reverse Discrimination and Efficiency in Education. International Economic Review 46: 1009-1031

De Fraja G (2002) The Design of Optimal Education Policies. The Review of Economic Studies 69: 437-466

Dolton P, Greenaway D and Vignoles A (1997) Whither Higher Education? An Economic Perspective for the Dearing Committee of Inquiry. Economic Journal 107 (442): 710-726

Dolton P, Makepeace G and Gannon B (2001) The earnings and employment effects of young people's vocational training in Britain. Manchester School 69 (4): 387-417

Erickson R and Goldthorpe J (1992) The Constant Flux: A study of Class Mobility in Industrial Societies. Oxford University Press, Oxford

Feinstein L and Symons J (1999) Attainment in Secondary School. Oxford Economic Papers 51: 300-321

Feinstein L, Duckworth K, and Sabates R (2004) A Model of the Inter-generational Transmission of Educational Success. Wider Benefits of Learning Research Report No. 10, Bedford Group, Institute of Education, London

Fryer R and Levitt S (2005) The Black-White Test Score Gap Through Third Grade. NBER Working Paper 11049, manuscript

Galindo-Rueda F and Vignoles A (2005) The Declining Relative Importance of Ability in Predicting Educational Attainment. Journal of Human Resources 40 (2): 335-353

Galindo-Rueda F, Marcenaro-Gutierrez O, and Vignoles A (2004) The Widening Socio-economic Gap in UK Higher Education. National Institute Economic Review 190: 70-82

Gayle V, Berridge D and Davies R (2000) Young People’s Routes to Higher Education: Exploring Social Processes with Longitudinal Data. Higher Education Review 33: 47-64

Gayle V, Berridge D and Davies R (2002) Young People's Entry to Higher Education: Quantifying Influential Factors. Oxford Review of Education 28: 5-20

Gayle V, Berridge D and Davies R (2003) Econometric Analyses of the demand for Higher Education. Department for Education and Skills Research Report RR471.

Gibbons S (2001) Paying for Good Neighbours? Neighbourhood Deprivation and the Community Benefits of Education. Centre for the Economics of Education, Discussion Paper No. 17, London School of Economics

Glennerster H (2001) United Kingdom Education 1997-2001. Centre for the Analysis of Social Exclusion (CASE), Paper 50

Goodman A (2004) Presentation to Department of Trade and Industry (DTI).

Greenaway D and Haynes M (2003) Funding Higher Education in the UK: The Role of Fees and Loans. Economic Journal 113 (485): F150-167

Haveman R and Wolfe B (1995) The Determinants of Children's Attainments: A Review of Methods and Findings. Journal of Economic Literature, 33 (4): 1829-1878

Howieson C & Croxford L (1996) Using the YCS to analyse the outcomes of careers education & guidance. The Stationary Office, DFEE Research Series, London

Jackson M, Erickson R, Goldthorpe J and Yaish M (2004) Primary and Secondary Effects on Class Differentials in Educational Attainment: the Transition to A level Courses in England and Wales. Meeting of the ISA Committee on Social Stratification and Mobility, Neuchatel

Lynn P (1996) England and Wales Youth Cohort Study: The Effect of Time Between Contacts, Questionnaire Length, Personalisation and Other Factors on Response to the YCS (Research Studies). The Stationery Office Books, London

Machin S and Vignoles A (2004) Education Inequality. Fiscal Studies 25 (2): 107-128

Machin S and Vignoles A (2005) What's the Good of Education? The Economics of Education in the UK. Princeton University Press, Princeton and Oxford

Payne J (2001) Patterns of Participation in Full-Time Education After 16: An analysis of the England and Wales Youth Cohort Studies. Department for Education and Skills, Nottingham, UK

Payne J, Cheng Y and Witherspoon S (1996) Education and Training for 16-18 Year Olds in England and Wales – Individual paths and national trends. Policy Studies Institute, London

Rice P (2004) Education and Training Post-16 - Differences across the British Regions. CEE conference, March

Rice P (1999) The impact of local labour markets on investment in further education: evidence from the England and Wales youth cohort studies. Journal of Population Economics 12 (2): 287- 31

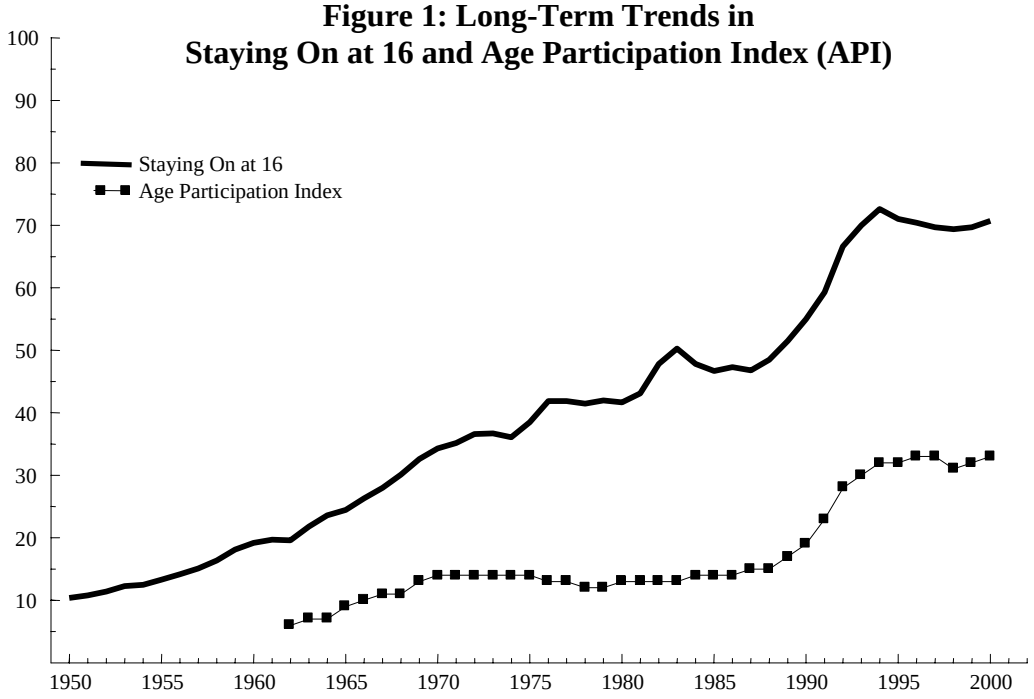
Saunders P (1997) Social Mobility in Britain: An Empirical Evaluation of Two Competing Explanations. Sociology 31: 261-288

Sianesi B (2003) Returns to Education: A non-technical summary of CEE work and Policy Discussion. Draft report for Department for Education and Skills

Schoon I, Bynner J, Joshi H, Parsons S, Wiggins RD and Sacker A (2002) The influence of context, timing, and duration of risk experiences for the passage from childhood to mid-adulthood. Child Development, Sep-Oct 2002 73 (5): 1486-1504

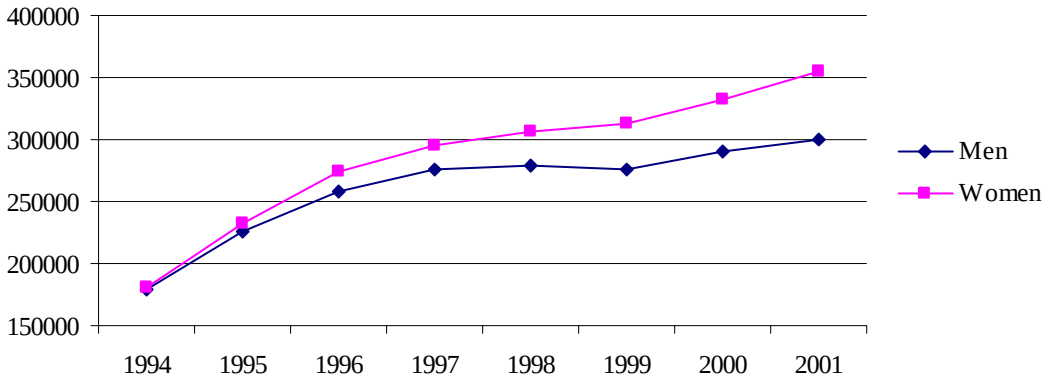
Woodhall M (ed.) (2002) Paying for Learning: The Debate on Student Fees, Grants and Loans in International Perspective. The Welsh Journal of Education 11 (1): 1-9

Figure 1: Long-Term Trends in Staying On at 16 and Age Participation Index (API)



Source: Chapter 4 in Machin and Vignoles (2005) Based on series provided by DfES. For related official statistics on education trends, see http://www.dfes.gov.uk/trends/. Staying on rates refer to England. API also includes Wales and Scotland.

Figure 2: Total number of students studying for a first degree, by gender (England and Wales)



Source: Higher Education Statistics Agency dataset.

Table 1: Age Participation Index (API) (%) by social class, 1991/2 – 2001

Class	Year of Entry									
Class	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**
Professional (A)	71	73	78	80	82	79	72	73	76	79
Intermediate (B)	39	42	45	46	47	48	45	45	48	50
Skilled non-man (C1)	27	29	31	31	32	31	29	30	33	33
Skilled manual (C2)	15	17	18	18	18	19	18	18	19	21
Partly skilled (D)	14	16	17	17	17	18	17	17	19	18
Unskilled (E)	9	11	11	12	13	14	13	13	14	15
A-C1	40	43	46	47	48	48	45	45	48	50
C2-E	14	16	17	17	18	18	17	17	18	19

Source: Department for Education and Skills Age Participation Index which measures the proportion of the under 21s in England, Scotland and Wales of each social class participating in Higher Education for the first time (i.e. young entrants from each social class as a percentage of all young people in each social class).

Table 2: Descriptive Statistics for YCS Sample

	Cohort 6 (1994)			Cohort 7 (1996)			Cohort 8 (1998)			Cohort 9 (2000)		
	Participating in HE	**Not participating in HE**	**Total**	**Participating in HE**	**Not participating in HE**	**Total**	**Participating in HE**	**Not participating in HE**	**Total**	**Participating in HE**	**Not participating in HE**	**Total**
Male	0.44	0.42	***0.43***	0.41	0.43	***0.42***	0.43	0.43	*0.43*	0.39	0.42	***0.41***
Parents' Socio-Economic Status:												
Professional, managerial & tech. oc.	0.36	0.20	***0.24***	0.29	0.20	***0.23***	0.39	0.23	*0.29*	0.38	0.22	***0.28***
Other non-manual occupations	0.26	0.18	***0.21***	0.21	0.18	***0.19***	0.28	0.20	*0.23*	0.27	0.21	***0.23***
Skilled occupations – manual*	0.27	0.38	***0.34***	0.32	0.34	***0.33***	0.19	0.32	*0.27*	0.23	0.34	***0.29***
Semi-skilled occupations - manual	0.06	0.12	***0.10***	0.08	0.12	***0.11***	0.07	0.12	*0.10*	0.07	0.11	***0.10***
Unskilled occupations	0.01	0.03	***0.03***	0.02	0.03	***0.03***	0.02	0.03	*0.03*	0.01	0.04	***0.03***
Other	0.04	0.09	***0.08***	0.08	0.13	***0.11***	0.05	0.10	*0.08*	0.04	0.08	***0.07***
Ethnicity:												
White*	0.93	0.93	***0.94***	0.92	0.92	***0.92***	0.91	0.93	*0.92*	0.90	0.90	***0.91***
Black	0.01	0.02	***0.01***	0.01	0.01	***0.01***	0.01	0.01	*0.01*	0.01	0.02	***0.01***
Asian	0.06	0.05	***0.05***	0.07	0.06	***0.06***	0.07	0.05	*0.06*	0.08	0.06	***0.07***
Other	0.00	0.00	***0.00***	0.01	0.01	***0.01***	0.01	0.01	*0.01*	0.01	0.02	***0.01***
Parental education:												
Father degree	0.29	0.12	***0.17***	0.27	0.11	***0.16***	0.31	0.15	*0.20*	0.32	0.15	***0.21***
Father at least one A level	0.10	0.08	***0.08***	0.12	0.07	***0.09***	0.12	0.09	*0.10*	0.12	0.09	***0.10***
Father below one A level*	0.61	0.80	***0.75***	0.61	0.82	***0.75***	0.57	0.76	*0.69*	0.56	0.76	***0.69***
Mother degree	0.17	0.07	***0.10***	0.18	0.06	***0.10***	0.21	0.10	*0.14*	0.23	0.12	***0.16***
Mother at least one A level	0.15	0.09	***0.11***	0.17	0.11	***0.12***	0.18	0.11	*0.14*	0.16	0.11	***0.13***
Mother below one A level*	0.68	0.84	***0.79***	0.65	0.83	***0.78***	0.61	0.78	*0.72*	0.61	0.77	***0.71***
Type of school attended:												
Comprehensive age 16	0.21	0.29	***0.27***	0.24	0.35	***0.32***	0.28	0.40	*0.36*	0.24	0.33	***0.30***
Comprehensive age 18*	0.54	0.60	***0.58***	0.49	0.53	***0.52***	0.42	0.45	*0.44*	0.51	0.53	***0.52***
Grammar	0.10	0.03	***0.05***	0.08	0.03	***0.04***	0.09	0.04	*0.05*	0.09	0.04	***0.06***
Secondary modern	0.01	0.04	***0.03***	0.02	0.04	***0.03***	0.02	0.04	*0.03*	0.01	0.04	***0.03***
Independent	0.14	0.04	***0.07***	0.17	0.05	***0.09***	0.20	0.07	*0.12*	0.15	0.06	***0.09***
Highest school qualification:												
One or two A levels	0.14	0.14	***0.14***	0.12	0.11	***0.11***	0.12	0.13	*0.13*	0.11	0.13	***0.12***
Three or more A levels	0.67	0.10	***0.26***	0.55	0.11	***0.24***	0.73	0.16	*0.35*	0.72	0.19	***0.38***
Five or more A-C GCSEs	0.97	0.41	***0.57***	0.96	0.47	***0.61***	0.97	0.55	*0.69*	0.98	0.57	***0.71***
Observations	2730	6696	***9426***	2343	5642	***7985***	3415	6496	*9911*	2186	4082	***6268***

Table 3: The Determinants of HE Participation (Marginal Effects)
Sample with 5+ Good GCSEs: Dependent variable degree versus other activities

	(1)	(2)	(3)	(4)	(5)	(6)
Sex (male =1)	0.018	0.039	0.036	0.018	0.039	0.036
	(2.61)***	(5.29)***	(4.74)***	(2.52)**	(5.22)***	(4.71)***
SEG: base case skilled manual						
SEG prof./managerial	0.058	0.030	0.011	0.057	0.024	0.002
	(6.07)***	(3.01)***	(1.04)	(3.19)***	(1.30)	(0.11)
SEG Other non-manual	0.060	0.034	0.017	0.043	0.022	0.007
	(6.13)***	(3.31)***	(1.59)	(2.25)**	(1.11)	(0.34)
SEG Semi-skilled manual	-0.009	0.001	-0.015	-0.057	-0.020	-0.026
	(0.64)	(0.04)	(0.99)	(2.00)**	(0.67)	(0.85)
SEG unskilled	-0.014	0.005	0.019	-0.063	-0.058	-0.026
	(0.52)	(0.19)	(0.66)	(1.07)	(0.93)	(0.40)
miscellaneous	-0.028	-0.001	-0.005	-0.070	-0.027	-0.013
	(1.76)*	(0.08)	(0.30)	(2.08)**	(0.77)	(0.34)
Cohort dummies: base case cohort 6						
Cohort 7: age 18 in 1996	-0.024	-0.026	-0.000	-0.016	-0.017	0.002
	(2.38)**	(2.53)**	(0.00)	(0.86)	(0.91)	(0.08)
Cohort 8: age 18 in 1998	-0.028	-0.032	-0.044	-0.059	-0.063	-0.060
	(2.94)***	(3.24)***	(4.30)***	(3.27)***	(3.35)***	(3.05)***
Cohort 9: age 18 in 2000	-0.022	-0.029	-0.051	-0.048	-0.043	-0.067
	(2.15)**	(2.70)***	(4.63)***	(2.46)**	(2.13)**	(3.24)***
Ethnicity						
Black	0.051	0.093	0.091	0.050	0.092	0.090
	(1.34)	(2.35)**	(2.23)**	(1.32)	(2.32)**	(2.21)**
Asian	0.167	0.191	0.193	0.167	0.191	0.193
	(10.54)***	(11.67)***	(11.47)***	(10.59)***	(11.69)***	(11.48)***
Other	-0.046	-0.042	-0.036	-0.046	-0.042	-0.038
	(1.27)	(1.12)	(0.95)	(1.28)	(1.14)	(0.98)
Ethnicity missing	0.019	-0.010	0.015	0.012	-0.012	0.017
	(0.27)	(0.14)	(0.20)	(0.18)	(0.17)	(0.22)
Parental education: base case father/mother with less than A levels						
Father degree	0.094	0.044	0.033	0.091	0.042	0.032
	(9.23)***	(4.21)***	(3.01)***	(8.92)***	(4.01)***	(2.94)***
Father A level	0.037	0.015	0.013	0.035	0.014	0.012
	(3.03)***	(1.20)	(1.01)	(2.82)***	(1.07)	(0.94)
Father education missing	-0.003	0.003	0.011	-0.005	0.002	0.012
	(0.21)	(0.24)	(0.75)	(0.37)	(0.16)	(0.80)
Mother degree	0.063	0.016	-0.003	0.061	0.016	-0.003
	(5.66)***	(1.42)	(0.24)	(5.56)***	(1.37)	(0.28)
Mother A level	0.049	0.019	0.009	0.049	0.019	0.009
	(4.57)***	(1.69)*	(0.81)	(4.55)***	(1.70)*	(0.82)
Mother education missing	-0.060	-0.051	-0.043	-0.061	-0.052	-0.043
	(4.32)***	(3.57)***	(2.91)***	(4.39)***	(3.61)***	(2.93)***
Type of school attended: base case comprehensive to age 18						
Age 16 comprehensive	-0.039	-0.037	-0.032	-0.039	-0.037	-0.032
	(4.70)***	(4.37)***	(3.62)***	(4.71)***	(4.38)***	(3.62)***
Grammar school	0.090	-0.012	-0.029	0.091	-0.011	-0.029
	(6.69)***	(0.85)	(2.02)**	(6.73)***	(0.82)	(2.01)**
Secondary modern	-0.127	-0.069	-0.034	-0.127	-0.069	-0.033
	(5.15)***	(2.68)***	(1.27)	(5.14)***	(2.67)***	(1.25)
Independent	0.089	0.001	0.012	0.089	0.001	0.012
	(8.07)***	(0.05)	(1.02)	(8.11)***	(0.05)	(1.05)
School type missing	0.270	0.181	0.269	0.271	0.184	0.271
	(1.76)*	(1.13)	(1.68)*	(1.77)*	(1.15)	(1.69)*

GCSE grades:						
GCSE maths grade		0.119	0.082		0.119	0.082
		(28.29)***	(18.67)***		(28.26)***	(18.64)***
GCSE math grade missing flag		0.279	0.186		0.281	0.186
		(8.87)***	(5.45)***		(8.91)***	(5.44)***
GCSE English grade		0.094	0.048		0.094	0.048
		(19.36)***	(9.48)***		(19.30)***	(9.47)***
GCSE English grade missing flag		0.008	-0.075		0.007	-0.076
		(0.19)	(1.71)*		(0.17)	(1.73)*
Highest school qualifications:						
One or two A levels			0.072			0.072
			(6.72)***			(6.70)***
Three or more A levels			0.361			0.361
			(41.73)***			(41.65)***
Interaction SEG with cohort 7:						
Professional*cohort 7				-0.040	-0.024	-0.001
				(1.53)	(0.89)	(0.03)
Non-manual*cohort 7				-0.023	-0.022	-0.011
				(0.83)	(0.76)	(0.36)
Semi-skilled*cohort 7				0.050	0.016	0.013
				(1.27)	(0.39)	(0.30)
Unskilled*cohort 7				0.109	0.107	0.081
				(1.39)	(1.29)	(0.93)
Misc*cohort 7				0.031	-0.007	-0.024
				(0.72)	(0.15)	(0.51)
Interaction SEG with cohort 8:						
Professional*cohort 8				0.019	0.030	0.012
				(0.80)	(1.20)	(0.47)
Non-manual*cohort 8				0.061	0.051	0.031
				(2.36)**	(1.91)*	(1.12)
Semi-skilled*cohort 8				0.075	0.041	0.018
				(1.98)**	(1.03)	(0.44)
Unskilled*cohort 8				0.040	0.077	0.052
				(0.54)	(0.99)	(0.64)
Misc*cohort 8				0.051	0.063	0.036
				(1.16)	(1.37)	(0.76)
Interaction SEG with cohort 9:						
Professional*cohort 9				0.028	0.018	0.030
				(1.07)	(0.67)	(1.05)
Non-manual*cohort 9				0.025	0.012	0.015
				(0.87)	(0.40)	(0.50)
Semi-skilled*cohort 9				0.065	0.025	0.015
				(1.54)	(0.56)	(0.34)
Unskilled*cohort 9				0.053	0.059	0.033
				(0.63)	(0.66)	(0.36)
Misc*cohort 9				0.107	0.060	0.028
				(2.05)**	(1.11)	(0.50)
Observations	21600	21600	21600	21600	21600	21600

Sample restricted to students from YCS cohorts 6, 7, 8 and 9 who attained at least 5 GCSE grades A-C by age 18. Base case is an individual with skilled manual background, white, parental education below A level, who attended a comprehensive school that accommodated students to age 18 and from cohort 6, i.e. age 18 in 1996. Estimated by probit.

Appendix A:

Table 4: Response rates for Youth Cohort Study surveys

Cohort	6 (1994)	7 (1996)	8 (1998)	9(2000)
Response Rate	69%	66%	65%	65%

Table 5: Characteristics of Sample for Sweeps 1 and 2 for cohort 7

	Cohort 7 Sweep 1 Sample restricted To those with 5+ good GCSEs	Cohort 7 Sweep 2 Sample restricted To those with 5+ good GCSEs
Male	0.43	0.40
Parents' Socio-Economic Status:		
Professional, managerial & tech. oc.	0.27	0.27
Other non-manual occupations	0.20	0.20
Skilled occupations – manual*	0.32	0.33
Semi-skilled occupations - manual	0.09	0.09
Unskilled occupations	0.02	0.02
Other	0.10	0.09
Ethnicity:		
White*	0.92	0.93
Black	0.01	0.01
Asian	0.06	0.05
Other	0.01	0.01
Parental education:		
Father degree	0.22	0.23
Father at least one A level	0.10	0.10
Father below one A level*	0.68	0.67
Mother degree	0.14	0.14
Mother at least one A level	0.15	0.16
Mother below one A level*	0.71	0.70
Highest school qualification:		
Five or more A-C GCSEs	1	1
Observations	9319	4883

Table 6: The Determinants of HE Participation (Marginal Effects)
Unrestricted Sample: Dependent variable degree versus other activities

	(1)	(2)	(3)	(4)	(5)	(6)
Sex (male =1)	-0.005	0.036	0.033	-0.006	0.035	0.033
	(1.01)	(6.66)***	(6.00)***	(1.16)	(6.58)***	(5.96)***
SEG: base case skilled manual						
SEG prof./managerial	0.099	0.030	0.012	0.140	0.041	0.022
	(13.20)***	(4.06)***	(1.66)*	(10.26)***	(3.09)***	(1.60)
SEG Other non-manual	0.089	0.031	0.016	0.111	0.036	0.022
	(11.67)***	(4.15)***	(2.08)**	(7.80)***	(2.55)**	(1.54)
SEG Semi-skilled manual	-0.029	-0.004	-0.013	-0.050	-0.005	-0.010
	(3.00)***	(0.40)	(1.27)	(2.72)***	(0.25)	(0.47)
SEG unskilled	-0.063	-0.016	-0.008	-0.109	-0.069	-0.053
	(3.74)***	(0.87)	(0.44)	(3.15)***	(1.79)*	(1.31)
miscellaneous	-0.061	-0.010	-0.012	-0.090	-0.017	-0.008
	(5.87)***	(0.92)	(1.07)	(4.41)***	(0.75)	(0.36)
Cohort dummies: base case cohort 6						
Cohort 7: age 18 in 1996	0.008	-0.008	0.014	0.045	0.013	0.029
	(1.08)	(1.09)	(1.86)*	(3.42)***	(0.97)	(2.09)**
Cohort 8: age 18 in 1998	0.015	-0.012	-0.019	0.008	-0.027	-0.022
	(2.10)**	(1.76)*	(2.63)***	(0.61)	(2.06)**	(1.61)
Cohort 9: age 18 in 2000	0.038	0.001	-0.017	0.052	0.008	-0.012
	(4.77)***	(0.14)	(2.18)**	(3.58)***	(0.59)	(0.86)
Ethnicity						
Black	-0.030	0.043	0.044	-0.031	0.042	0.043
	(1.24)	(1.62)	(1.60)	(1.27)	(1.59)	(1.57)
Asian	0.129	0.177	0.176	0.130	0.177	0.175
	(10.89)***	(13.93)***	(13.52)***	(10.97)***	(13.92)***	(13.50)***
Other	-0.014	0.000	0.002	-0.013	0.000	0.001
	(0.51)	(0.01)	(0.07)	(0.47)	(0.01)	(0.05)
Ethnicity missing	-0.040	-0.036	-0.023	-0.049	-0.037	-0.021
	(0.85)	(0.73)	(0.45)	(1.05)	(0.75)	(0.42)
Parental education: base case father/mother with less than A levels						
Father degree	0.109	0.029	0.020	0.106	0.027	0.019
	(13.18)***	(3.64)***	(2.45)**	(12.70)***	(3.42)***	(2.37)**
Father A level	0.057	0.016	0.013	0.055	0.015	0.012
	(5.76)***	(1.66)*	(1.31)	(5.51)***	(1.53)	(1.25)
Father education missing	-0.039	-0.008	-0.001	-0.042	-0.009	-0.001
	(4.12)***	(0.78)	(0.13)	(4.42)***	(0.93)	(0.13)
Mother degree	0.097	0.014	-0.003	0.096	0.014	-0.003
	(10.52)***	(1.59)	(0.39)	(10.43)***	(1.57)	(0.39)
Mother A level	0.076	0.016	0.008	0.076	0.017	0.009
	(8.73)***	(1.98)**	(1.00)	(8.71)***	(2.03)**	(1.04)
Mother education missing	-0.067	-0.042	-0.036	-0.068	-0.042	-0.036
	(7.01)***	(4.27)***	(3.60)***	(7.03)***	(4.29)***	(3.59)***
Type of school attended: base case comprehensive to age 18						
Age 16 comprehensive	-0.038	-0.027	-0.022	-0.038	-0.027	-0.022
	(6.32)***	(4.55)***	(3.58)***	(6.36)***	(4.56)***	(3.57)***
Grammar school	0.204	-0.007	-0.023	0.204	-0.007	-0.023
	(16.41)***	(0.68)	(2.17)**	(16.43)***	(0.66)	(2.15)**
Secondary modern	-0.133	-0.045	-0.024	-0.134	-0.045	-0.023
	(8.81)***	(2.78)***	(1.37)	(8.84)***	(2.79)***	(1.36)
Independent	0.177	0.004	0.013	0.177	0.004	0.013
	(18.01)***	(0.45)	(1.43)	(18.06)***	(0.44)	(1.44)
School type missing	0.315	0.112	0.205	0.316	0.116	0.208
	(2.26)**	(0.88)	(1.48)	(2.26)**	(0.91)	(1.50)
GCSE grades:						

GCSE maths grade		0.117	0.083		0.117	0.083
		(41.92)***	(28.65)***		(41.91)***	(28.63)***
GCSE math grade missing flag		0.210	0.115		0.212	0.116
		(9.90)***	(5.51)***		(9.97)***	(5.52)***
GCSE English grade		0.106	0.066		0.105	0.066
		(32.75)***	(19.60)***		(32.65)***	(19.58)***
GCSE English grade missing flag		0.142	0.062		0.140	0.061
		(5.13)***	(2.29)**		(5.06)***	(2.27)**
Highest school qualifications:						
One or two A levels			0.133			0.132
			(15.70)***			(15.67)***
Three or more A levels			0.360			0.360
			(49.00)***			(48.89)***
Interaction SEG with cohort 7:						
Professional*cohort 7				-0.091	-0.041	-0.022
				(5.10)***	(2.23)**	(1.18)
Non-manual*cohort 7				-0.073	-0.032	-0.022
				(3.82)***	(1.65)*	(1.10)
Semi-skilled*cohort 7				0.015	-0.015	-0.014
				(0.54)	(0.53)	(0.51)
Unskilled*cohort 7				0.117	0.101	0.083
				(2.13)**	(1.67)*	(1.36)
Misc*cohort 7				0.037	-0.021	-0.031
				(1.26)	(0.71)	(1.03)
Interaction SEG with cohort 8:						
Professional*cohort 8				-0.022	0.010	-0.005
				(1.22)	(0.57)	(0.28)
Non-manual*cohort 8				0.015	0.024	0.007
				(0.76)	(1.24)	(0.36)
Semi-skilled*cohort 8				0.047	0.011	-0.002
				(1.72)*	(0.40)	(0.07)
Unskilled*cohort 8				0.073	0.085	0.064
				(1.40)	(1.47)	(1.10)
Misc*cohort 8				0.040	0.037	0.021
				(1.32)	(1.18)	(0.67)
Interaction SEG with cohort 9:						
Professional*cohort 9				-0.039	-0.017	-0.008
				(2.01)**	(0.89)	(0.40)
Non-manual*cohort 9				-0.034	-0.017	-0.013
				(1.63)	(0.80)	(0.62)
Semi-skilled*cohort 9				0.031	0.011	0.006
				(1.03)	(0.35)	(0.19)
Unskilled*cohort 9				0.019	0.049	0.040
				(0.35)	(0.78)	(0.62)
Misc*cohort 9				0.060	0.018	-0.001
				(1.65)*	(0.48)	(0.02)
Observations	33590	33590	33590	33590	33590	33590

Sample: students from YCS cohorts 6, 7, 8 and 9. Base case is an individual with skilled manual background, white, parental education below A level, who attended a comprehensive school that accommodated students to age 18 and from cohort 6, i.e. age 18 in 1996. Estimated by probit.