Sheer Class? Returns to educational performance: evidence from UK graduates' first destination labour market outcomes

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Sheer Class? Returns to educational performance: evidence from UK graduates' first destination labour market outcomes

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Abstract

We exploit individual-level administrative data for whole populations of UK university students for the leaving cohorts of 1985-1993 (together with that of 1998) to investigate the influence of degree performance on graduate occupational earnings. We find that there is a significant premium associated with a good performance at university. We also find that this premium increased between 1985/6 and 1993/4, a period of substantial expansion in the graduate population. Among other results, we find that there are significant differences in the occupational earnings of leavers according to university attended, subject studied, and pre-university educational and social background, *ceteris paribus*.

Keywords: Graduate earnings, degree class, educational performance.

JEL Classification numbers: J3, J4, I2

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1 Introduction

This paper addresses the question of the extent to which the labour market outcomes of UK university graduates are related to their level of academic performance at university. Most work - both empirical and theoretical - on educational returns is concerned with the premia for additional qualifications or for years of schooling (see, for example **?**), **?**) and **?**)). We observe, however, that there is rather little variation in the amount of education attained by members of each given age cohort, as typically there is only a small number of discrete cut-off points at which individuals tend to complete their formal education. In the UK, for example, most of each cohort clusters around either the - predominantly - aged 16, aged 18, or aged 21 qualifications of GCSEs, A-levels or university degrees, respectively. In the context of this clustering in the amounts of human capital investment within cohorts, employers need to use finer filters in selecting between job applicants. Performance at each qualification level is likely to be one such filter. Accordingly, we think it interesting to investigate the relationship between educational performance - given qualification level - and subsequent labour market outcomes. Just as qualification level can be regarded as either a measure of human capital investment or as a signal of ability, so too could the qualification-specific performance level be interpreted in either of these two ways. For example, the student who does better at university could be thought of as having acquired more human capital through more productive study. Alternatively, a higher grade score at university could be interpreted as a signal of higher underlying ability (see **?**)).

The analysis of how graduates' labour market outcomes vary by particular characteristics - such as degree class - is relevant for public policy in the area of higher education. In the UK, for example, the method of financing students through university has changed substantially in the last two decades, with a shift in the burden from tax-payers to students and their families. A significant step in this process was the introduction of student loans in 1988 as a phased replacement of the system of local education authority maintenance grants. A second step was the introduction in Autumn 1998 of tuition fees for full-time UK students in higher education. Both of these policy changes followed extensive government inquiries to which evidence was presented showing high rates of return to university degrees. For example, the Report of the National Committee of Inquiry into Higher Education, **?**), cites evidence of an average rate of return of around 11% - 15%. This figure derives from analysis reported in **?**). Since the Dearing Report, and the subsequent legislation introducing tuition fees, debate has tended to polarise between those, on the one hand, who argue that fees have deterred participation from poorer families and hence should be withdrawn, and those, on the other hand, who argue that fixed-level fees should be replaced by 'top-up' fees which are differentiated by course and by

university, which current Government policy in the UK is pursuing. Following legislation in 2004-5, variable top-up fees were introduced in the UK in Autumn 2006.

The current paper attempts to inform the debate on higher education fees and funding policies by addressing the question of the extent to which graduates' post-university outcomes vary according to graduate characteristics such as subject studied, university attended and, in particular, degree class awarded. We exploit individual student-level data for complete cohorts of university graduates to analyse the determinants of graduates' first destination average occupational earnings. The importance of such an analysis is underlined in **?**) who call for estimates of how returns to degrees vary by factors such as subject studied and institution attended. They argue that if university fees become the norm, evidence on returns will be vital information for students, particularly as flat-rate fees evolve into differential fees by subject and institution, as first recommended in **?**): see also **?**).

Our focus on the impact of degree class on graduates' occupational outcomes is motivated by several considerations. First, there is an extensive literature examining the determinants of students' educational performance, see, for example; **?**), **?**), **?**), and **?**). This body of work shows that degree performance varies significantly by factors such as prior qualifications, previous schooling, gender and the social class background of students. This analysis of university educational outcomes is important in its own right, but has further significance the greater the impact of academic performance on graduates' labour market outcomes.

A second and related reason for our interest in degree class stems from the observation that graduate employers make employment offers which are often conditional on a certain minimum level of attainment at university. For example, it is common for employers to require graduate job applicants to obtain at least an upper second class honours degree.[1] It appears to be less common for employers to make the formal requirement of a first class degree. Nonetheless, student prospects may increase monotonically with the class of degree awarded.[2] Third, it is likely that student effort, and hence degree performance itself, will be influenced by students' perceptions of the premia associated with higher classes of degree. For example, previous research has shown that female students are more likely to obtain a good degree than are male students. One hypothesis to explain this would be that if the premium to a good degree is higher for females than males, then this might lead female students to higher effort than males.

Fourth, over the last two decades the size of the graduate population in the UK has grown significantly following the accelerated implementation of a policy commitment of the 1979 Government to raise the proportion of the 18-21 year old cohort in higher education from around

[1] We will follow the custom of referring to an upper second or first class degree as a 'good' degree.

[2] From a 1980 survey of one in six UK graduates, **?**) report that starting salaries are higher for graduates with a 'good' degree result.

10% to 30% within a 10-year period. The current government is committed to raising the participation rate to 50% for people aged less than 30. As the proportion of graduates in each cohort of young adults has grown, it is interesting to examine how the sensitivity of graduate labour market outcomes to the level of performance in higher education has changed. One hypothesis would be that as the graduate population has grown, it has become more important for students to distinguish themselves by a high level of attainment at university. In the current paper, we examine this question from an empirical perspective, focussing on the question of whether the premium for a first class degree has changed over time.

Finally, the data we exploit in the current paper contain higher education administrative data for the full cohorts of undergraduate students between 1985 and 1993, matching data on first-destination graduate labour market outcomes to a rich set of detailed information on the characteristics of students, such as the officially recorded class of degree award. Thus, the data provide a uniquely rich source of information for the analysis of the impact of degree performance on graduates' post-university first destination outcomes. Other data-sets which have been used to analyse graduate returns contain more detailed information on graduate pay. But no other data-set provides such detailed information on course characteristics and degree outcomes for entire cohorts of university graduates. We describe the relative advantages and disadvantages of different datasets in Section 2 below. The rest of the paper is then organised as follows. In Section 3, we describe our own data in some detail and present the results of a detailed analysis for the 1993 graduating cohort, focussing on the effects of institution, course and class of degree. Section 4 presents specific results for earlier cohorts and discusses observed trends over time in the estimated effects. Section 5 then considers some robustness checks of the basic empirical model and Section 6 closes the paper with conclusions and further remarks.

2 Data and evidence on graduate earnings

As noted above, evidence on the private returns to higher education have been influential in shaping policies towards the funding of university students in the UK. Policy discussions on differential fees are informed by analysis of variation in returns by degree subject. Estimation of the returns to a degree has been based on a variety of datasets, including: (i) cross-sectional surveys (some with panel elements), such as the General Household Survey (GHS), the Family Expenditure Survey (FES), the Quarterly Labour Force Survey (QLFS), and the British Household Panel Survey (BHPS) and (ii) Longitudinal Studies, such as the National Child Development Survey (NCDS), the Youth Cohort Survey (YCS) and the British Cohort Survey (BCS70). Examination of how returns to a degree might vary by factors such as institution

attended, subject studied and degree class awarded is hampered by lack of sufficient data on these characteristics in most of these data-sets. Typically, either the appropriate questions are not asked or the samples are too small to sustain significant estimated effects. See, for example, **?**) for a detailed description of the problems associated with estimating returns by subject from these datasets.

On the issue of variation in the returns to a degree according to the class of degree awarded, **?**) have used BCS70 data and have shown that there is some evidence that the returns to a degree are higher for students who have performed better at university. BCS70 data provide a rich data-set for the analysis of returns to higher education. However, the estimates of how these returns vary by degree class are based on necessarily small cell sizes. Furthermore, as the estimates are for just one cohort, it is not possible to form a picture of how returns to degree class might have been varying over time. For the US, work by **?**) and **?**) has found surprisingly weak effects of grade point average of college graduates on subsequent earnings.

In order to overcome the problem of small samples of graduates or of limited information on student characteristics, the richest data by far are administrative data held by the Universities Statistical Records (USR) and, since 1994, the Higher Education Statistics Agency (HESA). These data comprise detailed information on full cohorts of students leaving a UK university in each year since 1972. Hence, they also provide the possibility of comparisons over time across different graduate cohorts. The data include information, for all students, on personal characteristics (including age, gender, social class background), pre-university qualifications (such as A-level subjects and grades, including school attended), and university and course-related information (including specific subject studied and class of degree awarded). In addition, graduates are sent a First Destination Survey (FDS) asking for information on their employment and occupation status in their first year after graduation. The response rate to this survey is typically around 75%. FDS information on graduates' self-reported occupations is coded into 3-digit Standard Occupational Classification, to which information on gender-specific average occupational earnings can be merged from sources such as LFS and the New Earnings Survey (NES). Potentially, analysis of the determinants of occupational earnings based on the USR-FDS (or HESA-FDS) data has both advantages and disadvantages relative to other data-sets. The main advantages are (i) the extent of coverage of each graduate cohort and (ii) the detailed administrative nature of the educational data. The main weakness is that the information relates only to the early career path of graduates.

In addition to the USR/HESA data on full cohorts of graduates, there is also a series of follow-up surveys conducted on sub-samples of graduates from particular graduate cohorts. **?**) review the evidence on the self-reported earnings of samples of graduates from the (typically

quinquennial) graduate cohorts. The most recent data are those for the 1995 cohort. This is close in time to the most recent cohort - that of 1993 - for which USR-FDS data are available. In contrast to the USR-FDS data, the follow-up sample survey of the 1995 cohort contains information on the actual salary of graduates three and a half years after graduation. However, the sample omits key variables such as age, marital status and geographic region. Furthermore, the data cannot be matched to administrative student-level information, as does occur in the case of the USR-FDS data.

We conclude that there is a variety of datasets which one might exploit in order to analyse UK graduates' post-university labour market earnings. The only data-set which has not so far been exploited for this purpose is the USR(HESA)-FDS dataset, which has recently become available.[3] We believe that the USR(HESA)-FDS data have both advantages and disadvantages compared to other data sets which have been used to analyse graduate earnings and that analysis of the USR(HESA)-FDS data can potentially complement results from previous work and extend our understanding of the determinants of graduates' earnings. As we noted above, the main drawback of the data is that they provide information only on the early career path of graduates. Many graduates are likely to change occupation through their working life. Nonetheless, early career outcomes are likely to be an important factor shaping career development and hence analysis based on first destinations is valuable. A related problem with first destination evidence is that starting salaries might not be highly correlated with career earnings within an occupation. We overcome this problem by using gender-specific average occupational earnings. We discuss this in more detail below.

The particular focus of our empirical analysis concerns the occupational earnings premium associated with a graduate's degree performance. We are also interested in how any premium for a good performance has behaved over a time period in which (i) the size of the graduate population has grown considerably, (ii) the proportion of students awarded good degrees has increased, and (iii) labour demand has become more biased towards more highly skilled labour. We might expect skill-biased demand-side shifts to have raised returns both to qualifications and to educational performance levels and, in this way, to have raised the premium for a good university degree outcome. Similarly, **?**) show that a signalling model would predict that as the graduate population expands, *ceteris paribus*, so the return to higher classes of degree should increase. Against this, from a human capital perspective, an expanded graduate population, together with a higher proportion of good degrees awarded, is likely to have produced a relative increase in the supply of well-qualified graduates, tending to deflate the premium for a good

[3] USR data has been used to analyse students' performance at university (see, for example, **?**), **?**), **?**) and **?**)) and to examine the determinants of graduate employment status (see **?**)).

degree award. Ultimately, the issue is an empirical one.

3 Empirical analysis

We exploit information from administrative data from the Universities Statistical Records (USR) for the full graduating cohorts of 1985 through to 1993 to analyse UK graduates' first destination occupational outcomes. The data combine student records with responses to the first destination follow-up survey (FDS) of all graduates. From this survey we have information on each responding graduate's employment status in the first year after graduation, including the classification of the individual's occupation at the 4-digit SOC level. This we match to 3-digit gender-specific data on median occupational earnings from the New Earnings Survey. Our dependent variable is then the median occupational earnings of graduates for their first destination occupation after graduation.

Our analysis is complementary to previous work on the determinants of graduates' earnings, as we have discussed above. Our concern is not with the extent of the returns to a degree: we do not have data on any control group of non-graduates. Instead, we analyse how graduate earnings vary with specific graduate characteristics. **?**), **?**) and **?**) use data from the National Child Development Survey (NCDS) to estimate the *ceteris paribus* earnings premium for an undergraduate degree to be around 17% for men and 37% for women. For the 1970 birth cohort (BCS70), **?**) estimate corresponding average premia of 15% for men and 23% for women. Our aim in the current paper is to analyse variations around the average premium, focusing on the premia associated with the graduate's academic performance as measured by the class of degree awarded, but also addressing variations to particular subjects and institutions. This has policy relevance in that evidence of significant premia for certain subjects or institutions might be used to support the argument for differential fees. Conversely, any evidence of significant variation by other characteristics, such as by class of degree, might indicate a level of risk in the higher education investment decision that could exacerbate fears that higher fees might deter applications from students from less affluent socio-economic backgrounds.

Our dependent variable is the log of the graduate's 3-digit SOC gender-specific occupational earnings. We are particularly interested in the effect of the class of degree awarded on graduates' earnings. Given that we attribute to each individual their median occupational earnings, we do not capture intra-occupational differences in earnings across graduates. These differences are unlikely to be randomly assigned and hence there is the potential that estimated effects on occupational earnings are biased estimates of effects on actual earnings. One of the advantages of our focus on the effects of degree class is that we can be reasonably confident of the likely

direction of any bias in this case, as it is unlikely that intra-occupational earnings differences are negatively correlated with degree performance. Hence, we interpret our estimates of the effects of degree class as lower-bound estimates of their effects on graduates' earnings.

3.1 Summary statistics

The principal variables held on the USR undergraduate records can be categorised into four main groups. (i) *Personal Information*: including, date of birth, sex, marital status, country/county of domicile, country of birth, residence, overseas and fees status, occupation of parent or guardian, (ii) *Academic history*: including last full-time school attended, other education, GCE A-level or SCE higher grade results, course for which admitted, (iii) *Annual information*: such as university, subject, duration, type of course, enrolment date, method of study (e.g., part-time or full-time status) qualification aimed for, source of fees, accommodation, and (iv) *Leavers details*: including, qualification obtained, class of degree, date of leaving, reason for leaving, first destination.

Our analysis is based on university students who were registered for a degree-level course.[4] Initially, our analysis examines data for 1993 graduates and their first destinations in 1994. Subsequently, we examine the data on previous graduate cohorts for 1985 to 1992.[5] Of the 47,388 male graduates in 1993, 71% responded to the First Destination Survey. Of these, approximately 20% were unemployed or inactive six months after graduation, 22% were in further study and 58% were in employment. Of the 38,381 female graduates in 1993, 76% responded to the FDS. Of these respondents, 15% were unemployed or inactive, 16% were in further study, and 68% were employed. A total of 39,454 graduates in employment identified their particular occupation. For the purposes of the analysis of the 1993 graduates, we have matched the individual's reported occupation to the corresponding gender-specific 3-digit SOC median occupational earnings from the New Earnings Survey (1994).

Summary statistics for the 1993 graduates are provided in Tables 1 and 2. Table 1 presents summary statistics for the main explanatory variables used in our analysis. We note that of those in employment, 80% had taken A-levels prior to university and scored an average of around 25 points. 47% (47%) of both females (males) had attended a local education authority school and 22% (25%) an Independent school. Around 87% were aged less than 24 years at graduation. 7% (10%) of female (male) students graduated with a first class degree, 55% (45%) with an upper second class, 32% (33%) with a lower second class and 3% (7%) with a third class degree.

[4] We include all courses which typically lead to a classified degree. We exclude overseas students as only a small and unrepresentative sample respond to the FDS.

[5] In Section 4, we also present results based on an analysis of data for 1998 university leavers.

Table 2 shows the mean and standard deviation of occupational earnings, disaggregated both by gender and by area of degree subject. The table also shows the number of observations for each subject. For the whole sample, mean earnings of males were £450.28 per week, with mean earnings of females at £333.10, equal to just 76% of the mean for males. The standard deviation in earnings is very large and varies by subject: it is particularly large for graduates of Politics, Classics and Literature and Humanities, for example. Degree subject fields associated with relatively high average weekly occupational earnings were: Law, Computing, Economics and Mathematics.[6] The ranking of subjects is rather similar for men and women.

Table 2 also shows summary statistics for occupational earnings by degree class by gender. For male graduates, the raw differential for a first relative to an upper second degree class is 3.2%, while that for a lower second is -7.0% and that for a third class degree is -12.2%. For female graduates, relative to an upper second degree class, the raw differential for a first is 3.8%, that for a lower send is -4.7% and that for a third class degree is -5.7%.

With respect to changes across the cohorts between 1985 and 1993, we note that there was a growth in the overall number of students leaving university from 74,953 to 93,613 an overall growth rate of 25% or an average annual growth rate of 2.8%. Overall, the number of female students leaving university rose by 37% and the number of male students by 16%, with the proportion of females rising from 40% in 1985 to 45% in 1993. With regard to degree class breakdowns, 7.5% of males were awarded firsts in 1985 (compared to 9.6% in 1993) and 4.7% (6.9%) of females received firsts in 1985 (1993). Upper second class degrees were awarded to 31.1% (35.7%) of males in 1985 (1993) and to 36.5% (46.6%) of females. Lower second class degrees were awarded to 30.3% (27.7%) of males in 1985 (1993) and to 36.1% (28.0%) of females and thirds were awarded to 8.9% (6.8%) of males in 1985 (1993) and to 5.1% (3.1%) of females. Thus, we note that despite the rise in the size of the graduate population, there was an increase in the proportion of graduates obtaining good degree classes - that is, first or upper second class degrees.

The breakdown of students by social class background has remained relatively stable over the period with 62.4% (60%) of female (male) students coming from Social Class I or II in 1985 compared to 60% (59%) in 1993. The proportion of students coming from an Independent school background has grown steadily over the period, increasing from 16% (21%) of female (male) students in 1985 to 22% (25%) in 1993.

The raw occupational earnings premium for a first over an upper second degree was zero for male students in 1985 compared to the figure of 3.2% in 1993. For women the raw premium

[6] The classification of degree subject used is highly aggregated. Much finer subject group disaggregations could be used to give a more accurate picture of differences across subjects. Considerations of space prevent such an analysis in the current paper.

for a first relative to an upper second rose from 2.9% to 3.8% between 1985 and 1993. The raw (negative) premium for a lower second for men, relative to an upper second, changed from -2.8% to -7.0% and for women from -4.0% to -4.7% over this period. The equivalent premium for a third changed from -4.4% to -12.2% for men and from -4.7% to -5.7% for women. The main focus of section 4 is to examine how the *ceteris paribus* earnings premia by degree class behaved over time.

3.2 Results

Prior to analysing occupational earnings for the group of 39,454 students for whom we had information on occupation after graduation, we estimated a model of the first destination outcomes of these students in terms of whether they are observed (i) in employment, (ii) in further study, (iii) in a state of unemployment (or out of the labour force) or (iv) as not responding to the FDS. We model this outcome in a multinomial logit framework and correct the occupational earnings equation for possible self-selection by using a maximum-likelihood equivalent of the standard **?**) two-step procedure (see **?**)).[7] We note, however, that the p-values on the correlation term are not significant at even the 10% level in any of the cohort years analysed here. As a consequence of this finding all results reported in the rest of this paper are based on OLS.

In this section of the paper, we report results from estimating gender-specific occupational earnings equations for the 39,454 1993 UK university leavers employed in an identified occupation in the year after graduation. The dependent variable is the natural logarithm of the 3-digit SOC median occupational earnings of the individual university leaver. In the following section of the paper, we re-estimate the occupational earnings equations using data for other cohorts.

Table 3 presents the results of the occupational earnings regressions for the 1993 university leavers for both males and females. From the table, it can be seen that graduate occupational earnings of females are increasing in the age at which the student graduated, whereas this is not true for males. Similarly, marital status is associated with a significant earnings premium only for females. Students who studied part-time have occupational earnings after graduation which are no different from those of graduates who studied full-time. We note, however, that of 1993 undergraduate leavers, very few (i.e., just 2%) studied part-time. There are no effects on occupational earnings associated either with accommodation type or with whether the course had a sandwich (vocational placement) element (not reported in the Table).

Table 3 shows a clear pattern of the effects of Social Class background on male graduates' occupational earnings. Compared to an otherwise equivalent male graduate from a Social

[7] The multinomial logit results are available from the authors on request.

Class II (technical or intermediate managerial occupational) background, a graduate from a family background described as either Social Class IIINM (skilled non-manual), Social Class IIIM (skilled manual), Social Class IV (semi-skilled) or Social Class V (unskilled) has graduate earnings which are around 2% less. There is no significant difference between students from Social Class II and Social Class I (professional) backgrounds. For female students, there is the similar finding that graduate occupational earnings are around 3% lower for graduates from Social Class IV relative to Social Class II. Thus, there is some evidence, at least for males, that graduates from relatively more affluent backgrounds move into relatively high paying occupations after graduation. It does not necessarily follow from this that the rate of return from a first degree is higher for these students, as there may also be a social gradient in the counterfactual non-graduate earnings profile.

With respect to graduates' pre-university academic background, the table shows that, even after controlling for degree subject and classification, male graduates' occupational earnings are influenced by A-level outcomes. For males, an increase of six points in the A-level score (equivalent of BBB rather than CCC) is associated with 0.6% higher occupational earnings. There are no significant effects of A-level scores for women. Performance in Scottish Highers does not have significant effects on graduate earnings. There is a strong effect of having previously studied Mathematics at A-level: graduates with A-level Mathematics have over 1% higher occupational earnings, *ceteris paribus*. This is consistent with evidence presented by **?**) who estimate a substantial earnings premium for individuals with Mathematics A-level. We also know that degree performance itself is positively associated with having Mathematics A-level, see **?**): thus there are both direct and indirect influences of pre-university Mathematics on graduates' labour market outcomes.

Table 3 also shows the effect of school characteristics on graduate occupational earnings. On school type, the table shows that relative to a graduate who had attended a non-selective local education authority (LEA) school prior to university, earnings are 4.5% (2.4%) higher for male (female) graduates who had previously attended an Independent school. **?**) report a similar finding. Whether the result reflects differences in human capital or in social networks is not formally testable from information in our data-set. In a related analysis, **?**) show that the Independent school effect is not constant across Independent schools, but is greatest in schools charging the highest fees.

We note that there is a significant gender difference in graduates' occupational earnings. In the raw data, female average earnings are about 75% of male average earnings. From the separate regression analyses by gender, we calculate the Oaxaca decomposition and find that only about 3 percentage points of the gender gap can be explained by differences in average

characteristics. The remaining 22 percentage points are attributable either to discrimination or to gender differences in unobserved characteristics.

The regressions reported in Table 3 also included controls for university attended. Discussion of university effects is left to the next section of the paper where we address the issue of the stability over time in the rankings of the estimated university effects. Table 3 shows the estimated coefficients for the degree subject studied. The omitted dummy variable is for the case of a student studying for a Language degree. Hence, the estimated coefficient for Law implies that occupational earnings for a female (male) Law graduate are, on average, 35.0% (24.1%) higher than the earnings of an otherwise identical Language graduate. For females there are also highly significant and positive coefficients associated with Medical-related, Computing, Education, Mathematics and Creative Arts subjects. For male graduates there are significant and positive effects associated with Economics and Business, relative to Languages, with significant negative effects for Biology, Physics, Engineering, Humanities, Classics and Literature and Social Science (excluding Law, Economics and Business).

Turning to the main variable of interest, Table 3 shows the estimated coefficients and additional premia associated with the class of degree awarded to the graduate. The benchmark is a student graduating with an upper second class honours degree. Each of the coefficients is significant at 1%. For male graduates, the additional premium associated with a first class honours degree is 3.9%, relative to the case of a student with an upper second class degree. Relative to an upper second, there are (negative) earnings premia of -5.5% for a lower second and of -9.9% for a third class degree. Hence, for male graduates, there is a span of about 14% between occupational earnings associated with a first and those associated with a third class degree. There is a smaller span for females, with a premium of 3.6% for a first relative to an upper second class degree and negative premia of -4.2% for a lower second and of -5.3% for a third class degree, relative to an upper second. Thus, for females there is a span of about 9% between the occupational earnings of a first and those associated with a third class honours degree. One corollary of this is that the evidence is not consistent with the hypothesis that better performance at university by females stems from higher marginal returns to degree performance.

The estimates of the additional premia associated with the individuals' class of degree are therefore substantial. The most densely populated border between degree classes is that between an upper and a lower second class. The occupational earnings differential between these two classes is itself large at about 4% to 5%. However, there are significant additional premia associated with each class of degree. In the next section of the paper, we examine how these premia have behaved over time by replicating our analysis for other graduate cohorts.

4 Time trends in premia by degree class, course and university

The analysis presented so far relates to one cohort of graduates leaving university in 1993, but the magnitude of earnings premia associated with particular factors such as degree class awarded are not necessarily constant over time. In this section of the paper, we replicate the analysis reported in the previous sections of the paper separately for each of the cohorts of students graduating between 1985 and 1992,[8] a period during which there was a significant growth in the numbers of students graduating from UK universities. As we have seen, it was also a period in which the proportion of students obtaining good degree classes actually grew, despite the rise in the size of the graduate population. In this context, it is particualry interesting to analyse how the premia by degree class behaved over the time period.

Table 4 reports the estimated degree class earnings premia relative to an upper second class degree, for men and women respectively. The results are also represented graphically in Figures 1a and 1b, and reveal the increasing spread in the returns associated with the graduate's class of degree. Whereas in 1985 the added premium for a first class degree over a lower second class degree was 2.1% (4.1%) for males (females) (with the premium for a first over an upper second class degree insignificant), this premium increased so that in 1993 the premium for a first over a lower second was 9.2% (7.9%) for males (females).

The most recent leaving cohort for which the USR data are in the public domain is the 1993 cohort. Subsequent data are held by HESA and are not generally available. We have obtained data for the 1998 leaving cohort by special permission. The figures for 1998 (reported in Table 4), are based on HESA data for 1998 university leavers. It is interesting to consider the 1998 data as during the period 1993-98 the number of university students continued to expand: by about 10% if one considers only the pre-92 universities. Furthermore, the period was one in which the proportion of students with good degrees also continued to increase: from about 45% (54%) in 1993 to 48% (60%) in 1998 for male (female) students. We note that the HESA data are not entirely compatible with the earlier USR data. For example, the HESA data do not include information on either the school attended nor the A-level subjects of the students, although it does include information on each graduate's overall A-level score in their best three subjects.

Based on the 1998 HESA data, we estimate the gap between a first and a lower second class degree to be 9.4% (11.2%) for males (females). These data cover all Higher Education Institutions in the UK, including all of the former Polytechnics. However, restricting the analysis to solely pre-1992 ('old') universities makes very little difference to these estimates. Given that

[8] For each cohort year we use the appropriate 3-digit gender-specific data on median occupational earnings from the contemporaneous New Earnings Survey.

the HESA data do not include as much information as is available from the USR data, we have examined the sensitivity of the results to the set of control variables included by re-estimating the occupation earnings equation for the 1993 cohort of university leavers using only variables available in the HESA data set. The estimated effects remain essentially unchanged.

Earlier in the paper, we discussed briefly the predictions arising from human capital and the signalling models in a context of increasing numbers of graduates and an increasing proportion of graduates awarded distinctions. Over the period from 1985 to 1993, the university sector experienced an increase of approximately 25% in the number of students leaving university each year and an increase in the proportion of students obtaining either a first (or upper second) class degree. The empirical results show us that over this period of analysis, the premia for a first over an upper second class degree and for an upper second relative to a lower second class degree to have increased markedly. From our analysis of the 1998 HESA data, it also emerges that the same pattern continues to hold for the period 1993 to 1998. As we have discussed, these findings are consistent both with a skill-biased technological change interpretation of changing wage differentials and with the predictions of a signalling model. They are harder to reconcile with predictions derived from a human capital model and suggest that demand-side or signalling factors have dominated supply-side influences on graduate premia.

We now consider the estimated university effects and their stability over time. Figures 2a and 2b plot the rank position of seven (of the 57) universities, based on the estimated earnings premia (for males and females, respectively) estimated for students leaving university in each of the cohorts 1985 through to 1993. We also include the evidence from the equivalent analysis based on the HESA data for 1998. What is clear is the stability of the rank of these selected universities. For male students, with the exception of two universities, none of these seven universities is ranked outside the top 13 universities in terms of the university premia based on occupational earnings. The stability of the university rank positions based on female students is markedly less stable, but it is still that case that of the seven universities four are never ranked outside the top ten. We also note that six of the universities are common across males and females. However, despite the evidence of the stability of the rank positions of universities with the largest effects on earnings, we note that the rank positions of other universities are less stable over time, such that the correlation of university rank positions over consecutive years is on average only 0.7, falling to an average of around 0.6 over a three-year horizon.

The ranking of degree subjects according to the earnings premia appears to be more stable over time, with Law, Business, Economics, Computing and Mathematics always ranked as the top five subjects. The correlation in the ranking across all degree subjects over consecutive years is very high. The correlation over the whole period from 1985 to 1993 is 0.8 and indicates

that at least in the medium term there is stability in returns to degree subjects. These results suggest that the graduate labour market is very consistent over time in its ranking of the value of degree subjects: more so than in the case of particular universities. On this basis, it may be more feasible to attach differential fees to degree subjects than to individual institutions. However, for some top-ranked universities the institution effects are quite stable: suggesting that the very top-ranked universities on this measure may have greater market credibility in charging differentiated fees.

A number of other premia are remarkably consistent over time. Attendance at an Independent school is consistently associated with an additional premium of 2.4-4.5% for males and 0.9%-2.4% for females. For male students, the effect of coming from one of Social Class IIINM, IIIM, IV or V has the effect of lowering earnings by around 1% compared to a student from Social Class II. There are few significant effects of social class background for female students. A-level score has a consistently significant effect, with an additional 10 points corresponding to a 1% earnings premia for males. There is more variation in the effect for females, but the estimated coefficient on A-level score is always positive and significant. The effect of having Mathematics A-level is also largely consistent over time, conveying an additional premium of 1.0-1.6% for males and 1.0%-3.4% for females.

5 Robustness

There is an issue of whether the widening span in the occupational earnings associated with degree class indicates a growing tendency over time for a first class degree to enhance graduates' first destination employment outcomes - in the sense of raising median occupational earnings - or whether it reflects a widening inequality in the underlying distribution of median occupational earnings within the merged NES data. The econometric results reported in the previous sections used current occupational earnings from contemporaneous NES data. In this section, we report the results on the detailed premia by degree class for each year from 1985 to 1993 attributing to each 3-digit occupation the gender-specific median earnings averaged over the 9 years.[9] The results for the premia by degree class over time are represented in Figures 3a and 3b for men and women, respectively. Comparing Figures 3a and 3b with Figures 1a and 1b reveals that the results are remarkably similar. In other words, the pattern of change over time in the estimated degree class premia reflects the changing impact of degree class on the probability that a graduate will enter a high-paying occupation and does not arise simply because of changes over time in the underlying distribution of average occupational earnings.

[9] We also report the results for the 1998 cohort.

We also examine the robustness of the results of our analysis of first destination occupational earnings data in two further ways. First, using BCS70 data we estimate the additional premia by degree class, for those students who went to university, based on their reported hourly gross wage at age 33. We find that for males (females) the premia to a first class degree over a lower second class degree is 14.7% (26.0%), although due to small cell sizes in BCS70 (31 (33) males (females) obtained a first class degree) few of the estimated coefficients on the degree class variables are significant.[10] These figures are bigger than those of 9.2% (7.9%) based on occupational earnings for males and females, respectively, as reported in Table 3 for 1993 university leavers observed in USR data. We note that the USR data for 1993 relate to a time period close to that in which the BCS70 cohort would have been leaving university. We conclude that there is evidence in support of our earlier argument that the results based on the USR data can be regarded as providing lower-bound estimates of degree class effects on earnings. We also underline the benefit of the USR data which provides such a large population of graduates that we are able to obtain very precisely estimated coefficients.

Second, within BCS70, we compare estimates of degree class effects using actual gross hourly wages with estimates of the degree class effect when we assign to each individual median occupational earnings based on their 3-digit social occupation code. For males, the use of occupational earnings reduces the premia for a first relative to a lower second class degree to 3.3%, (compared to that of 14.7% based on actual gross hourly wages) again supporting our argument that the use of occupational earnings gives a lower bound for the premia associated with degree class. However, for females there are only very slight differences between the premium for a first over a lower second degree class based on gross hourly wages (26.0%) and that based on median occupational earnings (30.7%).

6 Concluding remarks

In this paper, we have exploited the individual-level USR data for 1993 UK university leavers to investigate the determinants of graduate occupational earnings. It has been estimated in previous work (see, for example, **?**)) that, *ceteris paribus*, there is an earnings premium for a first degree of approximately 17% for men and 37% for women. Our analysis can be interpreted as examining the determinants of variations around these averages. Thus, our results yield estimates of the 'additional premium' associated with particular factors. We have shown that there are significant occupational earnings differences across graduates according to the university attended and the subject studied. Furthermore, we have demonstrated that the ranking of

[10] Controls include parental SEG, parental education, parental interest in child education, region of residence, BAS (ability) score, ethnicity, house property, presence of father/mother at age 16, degree subject.

degree subjects in terms of their estimated effects on graduates' earnings are remarkably stable over time. This is less true of the ranking of universities, with the exception of a small number of universities which are consistently associated with the greatest estimated earnings premia.

Our results concerning university and subject effects might be taken as supporting the argument for the introduction of differential fees. However, our other results suggest that there is likely to be substantial variation around the average premium for a degree according to factors such as degree class, prior qualifications, previous schooling, and family background. In particular, our analysis shows that there are large and significant differences in graduates' occupational earnings according to the degree class awarded. For the average male graduate, for example, the difference in occupational earnings associated with a first class over a third class degree is about 12%. Among other results, we have shown that, relative to having previously studied at a state-sector LEA school, attendance at an Independent school has a statistically significant positive effect on earnings: for the average student, the *ceteris paribus* earnings differential is between 2% and 5% for males. These results indicate that although - as previous work has demonstrated - the *average* premium for a degree might be substantial, the expected premium is likely to be quite small in many cases, exacerbating the risk that higher costs will deter participation in higher education, especially for potential students for whom the marginal costs of education are relatively high.

We have argued that there are both advantages and disadvantages in the use of USR/HESA data to address the impact of factors such as degree class outcomes on graduates' labour market outcomes. We have argued that if there is a positive correlation between the effects of degree class on inter-occupational earnings and the effects on intra-occupational earnings - as seems plausible - then our estimates are likely to be lower bound estimates of the effects of degree class on graduate earnings. We have provided evidence from a complementary analysis of BCS70 data to support our result that there are substantial premia associated with performing well at university. The major advantage of our analsysis based on the USR data is that it exploits information for the full population of UK graduates in each of 9 cohorts. Furthermore, the data have enabled us to produce comparable estimates over the nine-year period and have generated the striking result that while for the 1985 graduates there was no significant premium attaching to a good performance at university, by the end of the period there was a significant and substantial premium associated with obtaining a good class of degree. Given the trends we have described in the graduate population, we suggest that this is consistent with the dominance of demand-side forces over supply-side influences on returns to performance at university. We note also that, in line with the theoretical model of **?**), the finding of a rising performance premium for graduates over a period in which the graduate population was expanding is consistent with

a signalling interpretation. Intuitively, the greater is the proportion of young people who obtain degrees, the more valuable it is to distinguish oneself further by obtaining a better class of degree.

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Table 1: Summary Statistics

	Males		Females	
Variable	Mean	SD	Mean	SD
Previous qualifications				
A-level	0.80	0.40	0.79	0.41
Highers	0.07	0.26	0.07	0.26
Other	0.08	0.28	0.07	0.26
No formal qual	0.05	0.21	0.06	0.24
A-level				
Score	25.7	8.9	24.1	7.8
Chemistry	0.33	0.47	0.24	0.42
English	0.21	0.41	0.45	0.50
Maths	0.59	0.49	0.34	0.48
Physics	0.44	0.50	0.15	0.36
Highers				
Score	12.94	4.79	12.64	4.26
School type				
LEA	0.47	0.50	0.47	0.50
Grammar	0.11	0.31	0.12	0.33
Independent	0.25	0.44	0.22	0.41
Further Education	0.09	0.29	0.10	0.30
Other	0.07	0.26	0.09	0.29
Part-time	0.02	0.15	0.02	0.15
Age groups				
<24	0.87	0.34	0.86	0.34
24-27	0.08	0.27	0.06	0.23
28-33	0.03	0.18	0.03	0.17
33+	0.02	0.15	0.05	0.22
Married	0.03	0.17	0.05	0.22
Social class				
SC I	0.18	0.38	0.17	0.38
SC II	0.41	0.49	0.42	0.49
SC IIINM	0.12	0.32	0.11	0.31
SC IIIM	0.10	0.31	0.10	0.29
SC IV	0.06	0.24	0.05	0.23
SC V	0.01	0.09	0.01	0.09
Unemployed	0.08	0.27	0.10	0.30
Degree class				
I	0.10	0.30	0.07	0.25
II.1	0.45	0.50	0.55	0.50
II.2	0.33	0.47	0.32	0.47
III	0.07	0.25	0.03	0.18
Other	0.05	0.22	0.03	0.18
First Destination Outcomes				
Out of Labour Force/Unemployed	0.14	0.35	0.11	0.32
Further study	0.16	0.36	0.13	0.33
Employment	0.41	0.49	0.52	0.50
Non-response	0.29	0.45	0.24	0.43

Table 2: Average occupational earnings by subject field and degree class

	MALES			FEMALES		
	Mean	Std. Dev	N	Mean	Std. Dev	N
ALL	450.28	115.91	19476	333.10	96.27	19978
Degree subject						
Medical related	440.98	90.29	491	363.77	73.15	1302
Biological science	411.15	121.70	1045	306.56	90.72	2067
Agriculture	403.70	107.55	197	299.73	79.18	193
Physical science	414.67	107.88	1840	311.36	86.11	1097
Math science	458.42	113.94	1197	338.61	83.60	838
Computing	455.25	81.04	1145	381.59	89.35	175
Engineering	427.06	83.35	3487	320.80	66.26	615
Technology	422.08	86.83	230	309.87	82.11	132
Architecture	420.70	76.50	337	329.71	64.41	125
Social science	413.34	123.39	876	308.35	88.91	1780
Law	580.19	92.35	1375	456.88	96.58	1547
Business Admin.	479.50	107.27	1535	311.34	74.92	1356
Classics+Literature	435.60	124.81	860	320.05	95.05	2280
Language	468.42	122.25	521	321.55	89.85	1673
Humanities	435.14	127.58	1377	313.50	94.23	1631
Creative art	450.47	104.20	248	341.59	108.71	579
Education	442.63	66.28	190	369.72	51.31	726
Other	458.34	123.85	565	317.51	87.49	765
Economics	482.95	133.22	1314	325.24	86.20	617
Politics	433.31	130.58	646	315.34	98.12	480
Degree Class						
I	480.14	102.37	1909	351.31	87.89	1309
II.1	465.25	115.34	8791	338.44	97.47	10982
II.2	432.62	116.50	6471	322.58	94.93	6381
III	408.41	110.02	1344	319.06	92.21	642
Other	431.57	113.13	961	323.36	95.95	664

Table 3: Results of occupational earnings regression equation

Variable	MALES Coeff		FEMALES Coeff	
Age				
Age <24 (default)	-		-	
Age 24-27	0.008		-0.002	
Age 28-33	-0.003		0.035	**
Age33+	-0.017		0.039	***
Married	0.022		0.031	**
Part-time	0.031	*	-0.004	
Social class				
SC I	0.005		0.011	*
SC II (default)	-		-	
SC IIINM	-0.023	***	0.009	
SC IIIM	-0.022	***	0.010	
SC IV	-0.024	***	-0.033	***
SC V	-0.024		-0.037	
Unemployed	-0.012		-0.008	
Academic background and schooling				
A-level score	0.001	***	0.000	
A-level subjects				
Biology	-0.011		0.001	
Chemistry	0.000		0.004	
English	-0.003		-0.002	
Maths	0.011	**	0.010	*
Physics	-0.002		0.010	
Higher score	0.001		0.003	*
School type				
LEA (default)	-		-	
Grammar	0.018	***	0.003	
Independent	0.044	***	0.024	***
Further Education	-0.013	*	0.015	**
Other	0.036	***	0.048	***

Note: *** indicates significance at the 1% level, ** signficance at the 5% level and * signficance at the 10% level.

Table 3 (cont'd): Results of occupational earnings regression equation

Variable	MALES Coeff		FEMALES Coeff	
Degree class				
I	0.038	***	0.037	***
II.1 (default)	-		-	
II.2	-0.054	***	-0.042	***
III	-0.094	***	-0.054	***
Other	-0.080	***	-0.080	***
Degree subject				
Medical related	-0.001		0.139	***
Biological science	-0.096	***	-0.051	***
Agriculture	-0.084	***	-0.049	**
Physical science	-0.080	***	-0.032	***
Math science	0.005		0.052	***
Computing	0.024	*	0.179	***
Engineering	-0.050	***	-0.003	
Technology	-0.054	**	-0.026	
Architecture	-0.065	***	0.047	*
Social science	-0.101	***	-0.042	***
Law	0.241	***	0.350	***
Business Admin.	0.063	***	-0.015	
Classics+Literature	-0.073	***	-0.008	
Language (default)	-		-	
Humanities	-0.065	***	-0.031	***
Creative art	-0.008		0.060	***
Education	-0.009		0.162	***
Other	-0.013		0.003	
Economics	0.038	***	0.007	
Politics	-0.060	***	-0.014	

Note: *** indicates significance at the 1% level, ** signficance at the 5% level and * signficance at the 10% level.

Table 4: Results of occupational earnings regression equation

		1985		1986		1987		1988		1989		1990		1991		1992		1993		1998 (All)		1998 (Old)	
	I	0.005		0.006		-0.007		-0.006		0.001		0.027	***	0.027	***	0.042	***	0.038	***	0.046	***	0.046	***
Males	II.1	-		-		-		-		-		-		-		-		-		-		-	
	II.2	-0.018	***	-0.011	***	-0.015	***	-0.025	***	-0.020	***	-0.031	***	-0.035	***	-0.052	***	-0.054	***	-0.050	***	-0.049	***
	III	-0.032	***	-0.029	***	-0.032	***	-0.056	***	-0.038	***	-0.058	***	-0.071	***	-0.092	***	-0.094	***	-0.094	***	-0.096	***
	I	0.012	***	0.012		0.018	**	0.028	***	0.026	***	0.033	***	0.025	***	0.053	***	0.037	***	0.066	***	0.067	***
Females	II.1	-		-		-		-		-		-		-		-		-		-		-	
	II.2	-0.030	***	-0.032	***	-0.028	***	-0.026	***	-0.030	***	-0.023	***	-0.038	***	-0.039	***	-0.042	***	-0.046	***	-0.046	***
	III	-0.062	***	-0.052	***	-0.040	***	-0.059	***	-0.049	***	-0.045	***	-0.065	***	-0.072	***	-0.054	***	-0.087	***	-0.065	***

Note: :*** indicates significance at the 1% level,** signficance at the 5% level and * signficance at the 10% level.

Figure 1a: Coefficients on degree class variables over time (current earnings) - Males

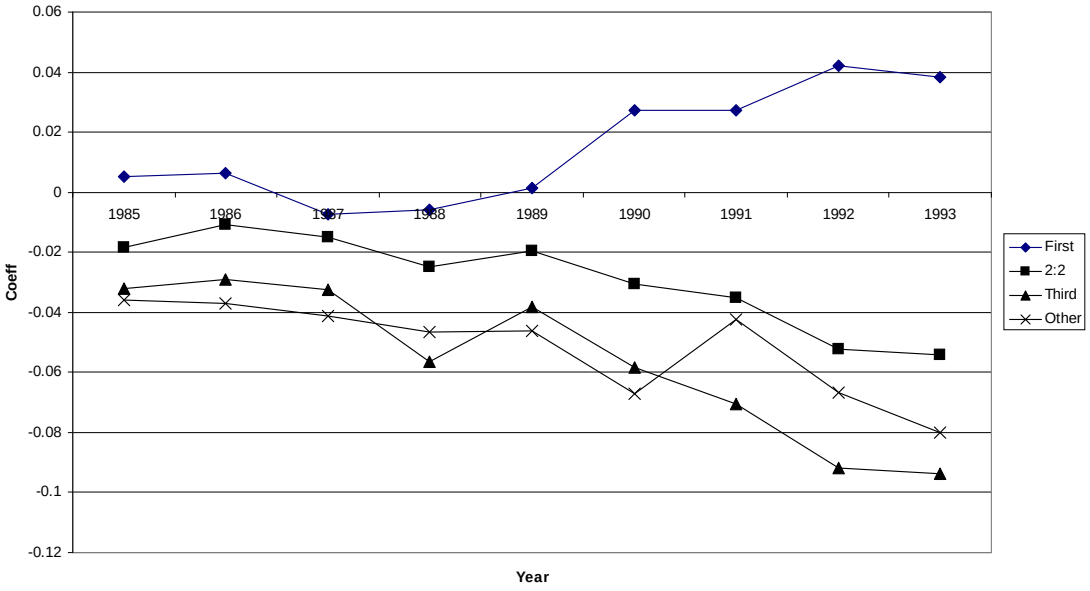

Figure 1b: Coefficients on degree class variables over time (current earnings) - Females

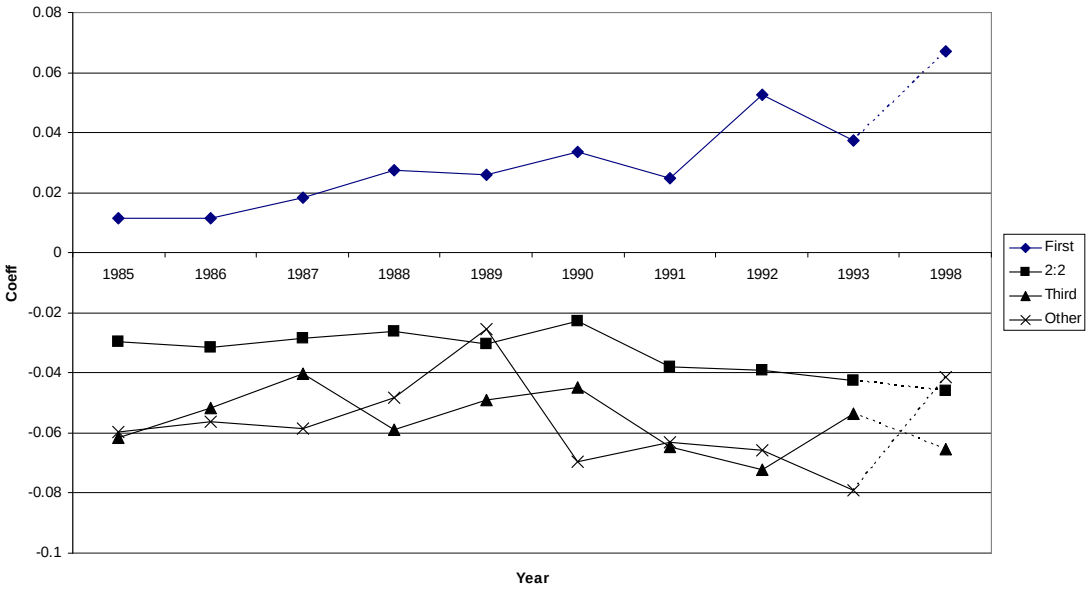

Figure 2a: University ranks over time based on earnings premia - Males

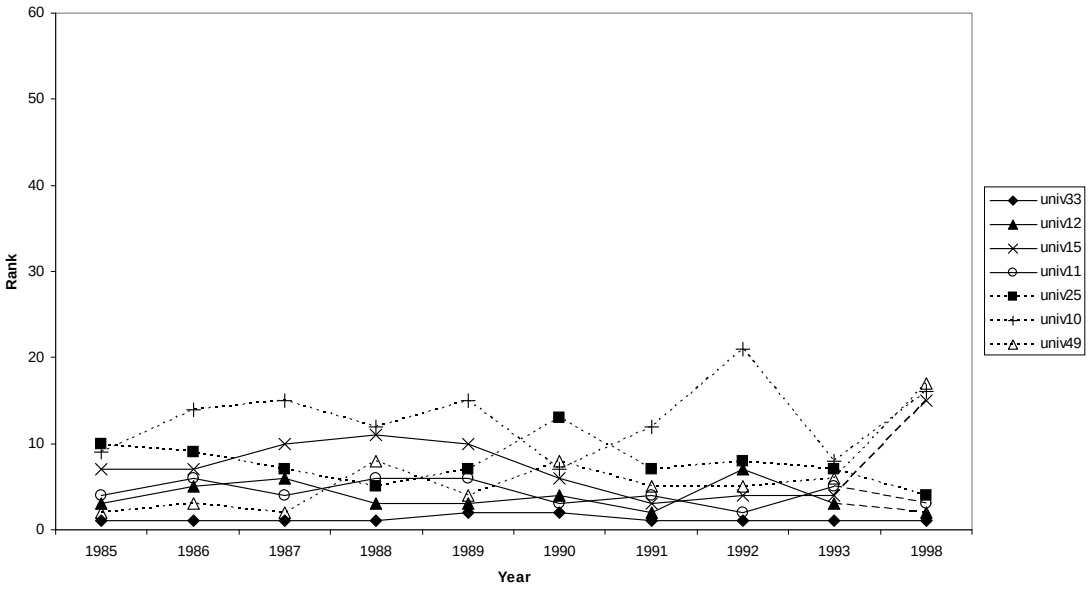

Figure 2b: University ranks over time based on earnings premia - Females

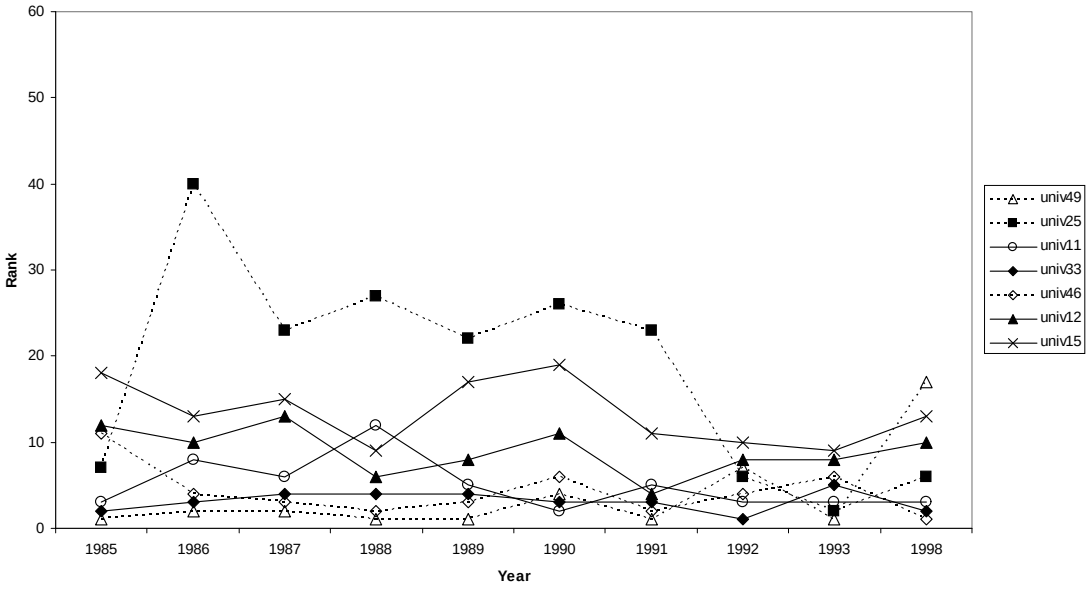

Figure 3a: Coefficients on degree class variables over time (constant earnings) - Males

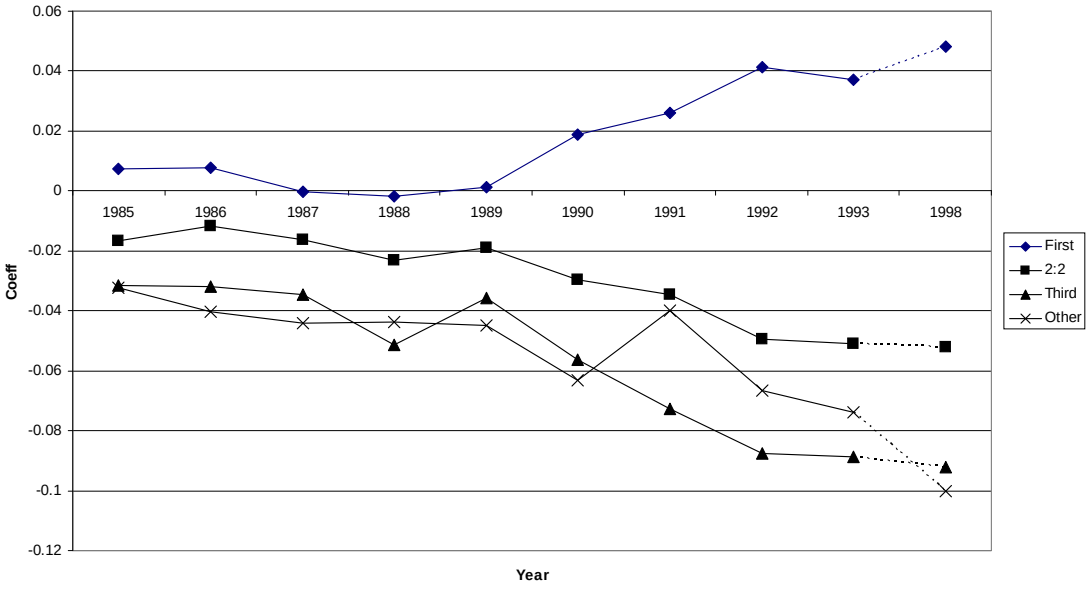

Figure 3b: Coefficients on degree class variables over time (constant earnings) - Females