Higher Education Academic Salaries in the UK

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Executive Summary

The recent industrial action taken by the Association of University Teachers (AUT) has given the issue of academic pay high prominence in the UK press. There appears to be a remarkable consensus that higher education academic salaries are too low, relative to other groups of workers in the UK, and that this is leading to an academic 'brain drain'. There is concern that this in turn will result in lower quality higher education, as universities fail to attract the 'brightest and the best'. To rise above the rhetoric, there is a pressing need for robust evidence on relative academic salaries. In this paper, we compare the salaries of Higher Education teaching professionals in the United Kingdom with those of other comparable professionals. We offer evidence on relative salaries in HE academia over the last decade or so and we compare academic salaries to a range of different comparator groups, including some specific occupational groupings that one might view as more similar, in terms of unobserved characteristics, to academics. We then consider the extent to which the gap between the earnings of HE academics and that of other occupations is attributable to differences in the characteristics of academics, for example the fact that they are more highly educated on average, or to differences in the price paid for a given set of characteristics.

Evidence on relative academic pay is necessary because, although academics form a very small proportion of the public sector work force and are arguably not hugely politically important, their pay is an important policy issue. One argument that is commonly made is that if policy makers do not address the problem of relative pay in academia, it may not be possible to maintain the high quality of the HE sector in the UK, with its strong international reputation. There is empirical evidence to support this view of a positive relationship between relative pay and the quality of workers, in academia and in the public sector more generally. The HE sector is also important for the UK economy. Universities UK (2006) report that the HE sector is worth £45billion to the UK economy and Higher Education export earnings are approximately £3.6billion. There is clearly a business case that can be made for ensuring that academia is seen as an attractive occupation, in the light of the contribution of the HE sector to the wider UK economy.

One potential consequence of relatively low academic pay is the much talked about 'brain drain'. The Department for Education and Skills has argued that relatively low pay for academics in the UK will impact on the ability of HEIs to recruit, retain and reward the best researchers and highlight a worrying trend increase in the number of unfilled vacancies in the HE sector, particularly in certain subject areas such as IT/computing, business and medicine. Given that a professor at a top British university can expect to earn half as much as her US counterpart, and that the US allocates 2.7% of GDP to HE whereas the comparable figure for the UK is 1.1%, it is

perhaps obvious that UK academics will be tempted to emigrate to the US at least (Economist, 'Battling for brains', September 23rd 2004).

This paper contributes to the debate in a number of ways. Firstly, we offer evidence on relative salaries in HE academia over a long time period, namely the last decade or so. Secondly, we go beyond comparing HE academic salaries with average wages. Instead we compare academic salaries to a range of different comparator groups, focusing instead on some specific occupational groupings that one might view as more similar, in terms of unobserved characteristics, to academics. Thirdly, we consider the extent to which the gap between the earnings of HE academics and that of other occupations is attributable to differences in the characteristics of academics, for example the fact that they are more highly educated on average, or to differences in the price paid for a given set of characteristics. We use pooled UK Labour Force Survey data for the years 1993 to 2005. These data are held at individual level and include information on each individual's annual earnings, hours of work, age, qualification level, ethnicity, gender, occupation and region of residence. We construct hourly earnings for all individuals in the sample (including part-time workers). The sample includes 260,484 individuals with wage information, of which just over 50,000 are university graduates.   We estimate earnings equations to compare HE academic pay to the pay of other selected groups, whilst controlling for observable characteristics that determine earnings and which may vary across the occupational groupings. Specifically we are able to control for ethnicity, age, gender, residential location, qualification level and degree subject. By including these personal characteristics in the model, we are able to assess the extent to which differences in hourly earnings between academics and other professional groupings are due largely to the personal characteristics of academics rather than their choice of occupation. Comparator groups of interest include secondary school teachers, medical professionals, accountants, engineers, lawyers and other professionals, split into public and private sector wherever possible.

We conclude that HE teaching professionals earn higher than average hourly earnings, as compared to all other workers, although they also work longer hours than most. However, once one compares HE teaching professionals with graduates or other more similar occupations that require a substantial amount of postgraduate training, their relative position does not look good. In particular, the earnings of HE teaching professionals compare very poorly to accountants, those in the legal professions, consultants, engineers, physicians, pharmacists and dental practitioners (across both the public and private sectors). In our study, there were only two groups of workers that did worse than HE academics, namely FE academics and, to a lesser extent, secondary school teachers.

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Acknowledgments

1.   Introduction

The recent industrial action taken by the Association of University Teachers (AUT) has given the issue of academic pay high prominence in the UK press.[1] Although some agreement has been reached between the unions and employers, the debate is set to continue since, despite a pay settlement and an end to the recent industrial action, there still remains the issue of the apparently widening gap between academic and non-academic salaries.

In fact there appears to be a remarkable consensus amongst policy-makers and the media that higher education academic salaries are too low, both in international terms and relative to other groups of professional workers in the UK. The UK government White Paper on Higher Education (DfES, 2003a 2003b) cited pay as one of the major issues facing the HE sector and explicitly acknowledged the relative decline in academic salaries in recent years. Furthermore, many of the arguments made in support of the higher education financial reform package now in place are underpinned by the notion that more resources need to be brought into the HE sector (via increased student contributions and other means), in order to fund HE salaries at a competitive level.

The media generally report that academic pay has been outstripped by earnings growth in other public sector occupations and since academic pay tends to increase more slowly over time, the earning differentials between academics and other professionals will widen (e.g. *Times Higher Education Supplement,* 'Academic pay rises lag behind teachers', 15th October, 2004). According to the THES the average real pay increase for public sector workers in general over the period 1993-2003 was 12.6% whereas academic pay only rose by 6.6%. The same article suggested that other comparable groups have experienced much more rapid growth in earnings. For example, physicians (26.6%), managers (31.6%), teachers (12.3%) and accountants (12.1%) all experienced larger wage increases. The empirical evidence is controversial however. Whilst the AUT claimed that lecturers' pay has declined by 40% in relative terms over the last 20 years (*The Guardian*, 'MPs back academics as strike looms', March 6th, 2006), the University College Employers Association (UCEA) argue that it in fact rose by 20.3% between 2001 and 2005. The AUT position has also been challenged in the media (*The Independent*, 'Academics are not so badly paid', 6th April, 2006). Unions, the

article pointed out, prefer data compiled by the Higher Education Statistics Agency which provides salary thresholds but does not include details of how many individuals are on each grade. The employers, however, prefer actual earnings data, which enable salary comparisons to be made. As is discussed in the next section, the academic literature on this issue is limited and there is a pressing need for robust and up-to-date empirical evidence on the relative earnings of HE academics.

Although academics form a very small proportion of the public sector work force and are arguably not hugely politically important, their pay is an important policy issue. One argument that is commonly made is that if policy makers do not address the problem of relative pay in academia, it may not be possible to maintain the high quality of the HE sector in the UK, with its strong international reputation. There is empirical evidence to support this view of a positive relationship between relative pay and the quality of workers, for example in academia and in the public sector more generally (Nickell and Quintini, 2002; Boyle, 2006). The HE sector is also important for the UK economy. Universities UK (2006) report that the HE sector is worth £45billion to the UK economy and Higher Education export earnings are approximately £3.6billion. There is clearly a business case that can be made for ensuring that academia is seen as an attractive occupation, in the light of the contribution of the HE sector to the wider UK economy. This has certainly been the view put forward in a number of influential government reports and White Papers (e.g. Bett Review, 1999; DfES, 2003a, House of Commons Education and Skills Committee, 2003).

One potential consequence of relatively low academic pay is the much talked about 'brain drain'. The Department for Education and Skills has argued that relatively low pay for academics in the UK will impact on the ability of HEIs to recruit, retain and reward the best researchers (DfES, 2003a, Chapter 4). Indeed the DfES (2003a) highlight a worrying trend increase in the number of unfilled vacancies in the HE sector, particularly in certain subject areas such as IT/computing, business and medicine. Given that a professor at a top British university can expect to earn half as much as her US counterpart, and that the US allocates 2.7% of GDP to HE whereas the comparable figure for the UK is 1.1%, it is perhaps obvious that UK academics will be tempted to emigrate to the US at least (Economist, 'Battling for brains', September 23rd 2004). The Royal Economic Society has urged action, arguing that the scale of the problem is such that around a quarter of science Fellows actually work

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[1] See for example *The Guardian* 'Lecturers 'Barred' from Pay Talks Until Marking Ban Ends', March 28th, 2006

outside the UK, 12% in the US (Roberts, 2002). By contrast, the UCEA has suggested that there is not a general recruitment and retention crisis, so pay rates must, it has argued, be competitive. To support this view, there is evidence from the Higher Education Policy Institute that the UK is, in fact, a net importer of academics (THES, 'UK Brain Drain Myth Exposed', 7th October, 2005). For every 10 academics exported, UK academic institutions appear to have received 14 from overseas over the period 1995/6-2002/3. Clearly this does not disprove the 'brain drain' argument though. In fact one might argue that academics from overseas are replacing UK academics precisely because of the brain drain problem.

To rise above the rhetoric, there is a pressing need for robust empirical evidence on a range of issues around both academic salaries and the overall level of resourcing of the HE sector. In this paper, we compare the salaries of Higher Education teaching professionals in the United Kingdom with those of other comparable professionals, to investigate the extent to which academics earn more or less than other similarly qualified individuals in the UK. We add to the existing literature in a number of ways. Firstly, we offer evidence on relative salaries in HE academia over a long time period, namely the last decade or so. Secondly, we go beyond comparing HE academic salaries with average wages. Instead we compare academic salaries to a range of different comparator groups, focusing instead on some specific occupational groupings that one might view as more similar, in terms of unobserved characteristics, to academics. Thirdly, we consider the extent to which the gap between the earnings of HE academics and that of other occupations is attributable to differences in the characteristics of academics, for example the fact that they are more highly educated on average, or to differences in the price paid for a given set of characteristics. This paper therefore also provides evidence, for a select range of occupations, on the extent to which some groups of workers are able to secure a higher price for their endowments.

2.   Background Literature

Whilst the literature on school teachers' pay is considerable, both in the UK and in the US (e.g. Allegretto *et al.,* 2004; Chevalier *et al.*, 2002, Stoddard, 2005; and Taylor, 2005 to cite but a few), the literature on academic pay in higher education is relatively limited. There is in

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or *The Telegraph* 'Pay Row Could Leave Final Exams Unmarked', 3rd April 2006.

fact a large literature on intra-industry earnings differentials, i.e. differences in pay between different types of HE academic, and the link between academic pay and productivity. For example, there is a literature on academic wage differences by gender, ethnicity, age and subject area (Barbezat, 1987; Bayer and Astin, 1968; Blackaby and Frank, 2000; Blackaby *et al*., 2005; Ginther and Hayes 1999; Moore *et al.* 1998). There are also a few cross-country papers that compare academic pay across different countries (e.g. Metcalf *et al.*, 2005*;* Ong and Mitchell, 2000 and Stevens, 2004). With the notable exceptions of Stevens and Metcalf *et al.*, we were unable to find any published UK research that examined differences between HE academic pay and other similar professions.

Stevens (2004) examines the recruitment and retention problem in UK Higher Education Institutions (HEIs). He compares the salaries of academics in the UK relative to their US counterparts in order to help explain why the US is the most favoured destination of migrating academics. In addition, he compares UK academic salaries with other graduate professionals in the UK, to demonstrate why an academic career is a less attractive option to 'potential' academics. Stevens uses the quarterly data from the Labour Force Survey (LFS) from Spring to Winter 2001 for the UK and the Current Population Survey 2001 for the US to estimate earnings.

Stevens found that academic salaries start at a lower level for graduates in the UK and that the predicted lifetime earnings of UK academics are lower than their non-academic counterparts. Controls for both personal characteristics and the possession of PhDs were made. In comparison, US academic salaries start at a slightly higher level and, although both rise at a similar rate initially, US academics do not experience a relative decline in their salaries as UK academics do (at about the age of 50 for men and 45 for women). Instead, US academic salaries rise at a slower rate and then taper off. Stevens attributes this to greater flexibility in setting pay in US HEIs. Overall, he concludes that both UK and US academics are paid less than their non-academic counterparts and that relative UK academic pay rates are below those of their US counterparts at all ages, which contributes to the current recruitment and retention problems being experienced by the sector.

Metcalf *et al.* (2005) studied the reasons for individuals entering and leaving academic employment in HE institutions (HEIs) in England using staff and student data from the Higher Education Statistics Agency (2001/02), as well as quantitative and qualitative data

collected specifically for their study. By matching samples on a range of characteristics, they compared the pay of UK academics with similarly qualified professionals in the UK and with other academics in the USA, Canada, Japan, Sweden, France, Australia and Japan. In each country they used the relevant national labour force survey data. The data are quite problematic, for example the destination details of 60% of those leaving the profession were not available. However, it is the most comprehensive study of its type in the UK.

The results of the Metcalf *et al*. study indicated that, in comparison to other highly qualified workers, academics fared relatively worse. They argued that this could deter new entrants into the profession. Relatively lower pay would however, have a lesser impact on incumbents who are less likely to exit the profession as their skills become more highly specialised and, perhaps, less transferable over time. Metcalf *et al*. also concluded that academic pay in England is relatively higher in real terms when compared to academic pay in Australia, New Zealand, Japan and Sweden, though it is broadly similar to pay levels in Denmark, France and Canada. US academics, they suggest, receive relatively more and this could be a significant factor in attracting UK academics to US HEIs. Although the authors did not identify acute recruitment and retention problems in UK universities, they did report that some vacancies went unfilled and that there was a perceived deterioration in the quality of candidates for vacant positions. The study found that 40% of recruits into the sector were non-UK nationals.

3.   Data, Methodological Issues and Descriptive Statistics

For this study, we use pooled UK Labour Force Survey data for the years 1993 to 2005. These data are held at individual level and include information on each individual's annual earnings, hours of work, age, qualification level, ethnicity, gender, occupation and region of residence. We construct hourly earnings for all individuals in the sample (including part-time workers) and we exclude from our sample individuals who are younger than 20 and older than 65. The dependent variable used in regressions is the log of net wages per hour, where net wages per hour are the sum of primary (*netwk*) and secondary (*netwk2*) occupations net wages divided by actual hours worked (*acthr* and *acthr2*). The sample includes 260,484 individuals with wage information, of which just over 50,000 are university graduates. We

only focus on those in full time employment.

We estimate earnings equations to compare HE academic pay to the pay of other selected groups, whilst controlling for observable characteristics that determine earnings and which may vary across the occupational groupings. Specifically we are able to control for ethnicity, age, gender, residential location, qualification level and degree subject. By including these personal characteristics in the model, we are able to assess the extent to which differences in hourly earnings between academics and other professional groupings are due largely to the personal characteristics of academics rather than their choice of occupation. Comparator groups of interest include secondary school teachers, medical professionals, accountants, engineers, lawyers and other professionals, split into public and private sector wherever possible. The vector of occupation dummy variables includes different occupations according to the particular specification in use but always includes a dummy variable equal to the value of one if the person is an HE academic. The coefficient on the HE academic variable therefore measure the wage premium earned by HE academics compared to the base comparator group, once one takes account of both schooling levels and other personal characteristics.

There are a number of potentially important methodological problems that one must be aware of. Firstly, there is the well-known issue of ability bias. It may be that academics are more able (or less able) on average than other workers. This may mean that they would earn more (or less) in the labour market; regardless of what profession they chose to work in. We do not have a measure of IQ or ability in our data and therefore cannot include this factor in the modeling. However, we attempt to address this issue at least in part by comparing HE academics with other workers that *a priori* one might argue would have similar ability. Thus we emphasize the results that compare HE academics with physicians and lawyers, who have similar status and training requirements, as compared to the results based on a much more diverse group of graduates. Another more general issue is that workers tend to choose occupations that they will do well in and we cannot take this occupational choice into account in our model. Despite these caveats, our results do provide clear descriptive evidence of the relative wages of HE teaching professionals as compared to other groups of workers, and as such can usefully inform policy in this area.

Within this sample we have 1,437 HE academics. We define HE academics as those

individuals who state that they are teaching professionals working in the HE sector, which unambiguously includes only those at the professional level in HE. One would also like to identify researchers in Higher Education, some of whom may not have been categorized as academics (this might particularly be the case for part-time researchers early on in their careers). However, investigation of the LFS data suggested that selecting individuals who classified themselves as researchers and then identifying those working in the HE sector was not satisfactory and less than 100 individuals in our sample classified themselves in this way. We therefore focus exclusively on HE teaching professionals, a group that henceforth we describe as HE academics.

Table 1 compares the mean log hourly earnings of various occupational groups. As can be seen, HE teaching professionals with real hourly wages of £8.92, rank below accountants (£9.63), consultants (£10.75), lawyers (£10.23), physicians (£10.56), pharmacists (£9.19) and dentists (£12.88) but above other academics (i.e. FE employees: £8.38), secondary school teachers (£7.91), engineers (£8.25) and graduates as a group (£8.68). In terms of hourly pay, then, HE teaching professionals do poorly compared with many other occupational groupings but still do better than the average graduate in terms of net hourly wages.

The average hours worked for 11 occupational groups is given in Table 2. The average hours worked by all graduates in their primary job (excluding unpaid overtime) is 34.2 hours. HE teaching professionals work only slightly more hours than the average for the group as a whole and record amongst the fewest hours as compared to physicians, engineers and consultants who work much longer hours. Even when second jobs are included, the picture changes little in terms of occupational rankings by hours worked. However, once overtime (paid and unpaid) is included, HE teaching professionals record the second highest number of hours worked on average, behind physicians. In other words, HE professionals appear to be working large numbers of over time hours, which by and large will be unpaid, as compared to other occupational groups. In terms of total hours worked, therefore, HE academics are an occupational grouping that works comparatively long hours.

Table 3 tracks changes in average hours worked over time for selected occupational groups. Although HE teaching professionals have generally worked longer hours than secondary school teachers, the position began to reverse by 2004. From a peak of 49 hours in 2000/2001 and 2002/03, HE academics have experienced a slight fall in the number of hours worked.

Physicians have seen a 15.1% fall in their average hours over time though they still worked the greatest number of hours in total compared to the other groups in 2004. The final two columns of the table show the differences in average hours worked between HE academics and all graduates as well as those graduates employed specifically in the public sector. Average hours worked by graduates has remained stable over time but the gap between HE teaching professionals and average graduate hours widened throughout the nineties, as HE academics worked longer hours. However, the gap reduced somewhat in 2004 as the hours worked by HE teaching professionals fell. Public sector graduates, on the other hand, have tended to work longer hours and therefore the gap between them and HE teaching professionals is not as great. Once again the gap narrowed in 2004.

It therefore appears that, in terms of hourly wages, HE academics do relatively poorly compared to many other professional groupings, although better than the average graduate. Of course we do not know whether this is because HE academics have other characteristics, such as fewer years of work experience, that mean that they earn lower wages than many other types of professional. This is explored in the regression analysis below. It is worth noting however, that HE academics' total hours worked per week is relatively high. We allow for this in the regressions below by using log hourly wages.

4.   Regression results

The main regression estimates are presented in Table 4. The results come from a standard Mincer model of earnings.[2] The regression includes a range of controls, such as gender, age, ethnicity, education and region of residence. The first column of results compares the hourly wages of HE academics and a number of other specific occupations, to the hourly wages of all wage earners omitting educational attainment. Some of the coefficients in the first column of results are unsurprising. For example, the regression suggests that older workers earn more than younger workers, women earn less than men, and some ethnic minority groups earn less than whites. We introduce educational and degree subject variables in the second

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[2] Throughout the analysis we use hourly wages that incorporate primary and secondary earnings. We have examined the data excluding part time employees under alternative definitions of full-time employment (working more then twenty-five and thirty-five hours per week) and the findings of the paper do not change qualitatively. We also examine primary wage earners in isolation. Again there was no qualative change to the key findings.

specification. The coefficients on degree subjects are interesting in that the wage premium from certain degree subjects is considerably above the average for all other graduates. In particular science, and social science attract a higher wage premium. As one might also expect, more educated individuals by and large have higher earnings. The wage premium for a Doctorate is approximately 44% and the premium for a Masters degree around 40%, for example, as compared to an unqualified worker.

The coefficients of greatest interest, however, are on the specific occupations listed towards the bottom of column one. These suggest that HE academics earn about 24% more than all other workers but only 2.7% more than other workers when education attainment is controlled for in the equation (column 2). However, we identified a major methodological issue in this research, namely the potential for ability bias. It is possible that HE academics are of higher (lower) ability than other groups of workers and that since we do not have any measure of this ability in our model, we have biased estimates of the wage premium associated with being an HE academic. As has already been said, we are unable to include measures of ability in our model due to data limitations. However, we are able to make comparisons with groups that are arguably more similar to HE academics, in terms of their expected unobserved characteristics. We thus compare the wage premium for HE academics to the premium earned by physicians, dentists, secondary school teachers, FE teachers and a number of other occupations that we argue are more comparable than the heterogenous group of all graduates. Whilst this does not overcome the problem of endogenous occupational choice, such comparisons are more meaningful than comparing academics to all other occupational groupings.

Focusing now on these more comparable groups, the first column of Table 4 suggests that HE academics earn a more favorable wage premium as compared to other workers than do secondary school teachers and FE academics. However, accountants, those in the legal profession, consultants, physicians, pharmacists and dental practitioners all attract considerably higher wage premiums than do HE academics. Once one controls for education in the model however, HE academics earn a similar wage to FE academics and secondary school teachers, and a considerably lower premium than other professional groups. Thus for example, consultants earn 28% more than the average worker, whilst academics earn just under 3% more than the average worker.

Another consideration when choosing a comparator group is the fact that HE academics are almost universally highly educated, as are individuals in the comparator occupations of interest, such as doctors and lawyers. That education is a crucial factor across all the professions examined is highlighted by the substantial decline in wage premiums for specific occupations when educational attainment and degree subject are introduced in column 2. Thus for columns 3 and 4 we restrict the sample to graduates only, i.e. all individuals who have a first degree or above. Almost all HE academics are employed in the public sector, so we start by analyzing a sample of all public sector graduates as a natural comparator group. The third column of results in Table 4 shows the coefficients from a model where the base case is all public sector graduates. Many of the coefficients change, reflecting differences in pay practices in the public sector. For example, the wage premiums associated with age are higher in the public sector graduate regression, reflecting the importance of seniority in determining pay in the public sector. However, we focus most of our commentary on the occupational coefficients, which are our prime interest. HE academics earn around 3% less than the average public sector graduate employee. Again this compares favorably to FE academics and similarly to secondary school teachers. However, HE academics are rewarded poorly when compared to all the other comparator groups. The ranking of the professions is actually quite similar across the different specifications. Thus HE academics still compare relatively poorly to those in the legal profession, accountants, physicians, pharmacists and dental practitioners. HE academics do earn significantly less than engineers too, although the gap is not so large.

In column 4, HE academics are compared to all graduates regardless of sector of work. Again, we are most interested in the coefficients on the occupation variables. HE academics earn around 3% less than all graduates. The ranking of the different professions does not change substantially as compared to the previous regressions. The only other professional groupings that earn less then the average graduate are secondary school teachers and FE academics, the latter being particularly poorly paid relative to the average graduate. Secondary school teachers and HE academics are similarly rewarded after controlling for education and other characteristics. All other professions listed earn significantly more than HE academics, with dental practitioners being most highly rewarded.

One can conclude from Table 4 therefore that whilst HE academics do relatively well compared to the average worker, and somewhat better than the average worker with a similar

level of education (see column 2), they do earn considerably less per hour than most of the other specific professions mentioned. Since many of these more specific professions have been selected for their long training period, one could argue that they should include individuals that are more similar to HE academics. If low relative pay affects the quality of those entering the HE academic profession, it may be of concern that we observe that HE academics earn consistently less per hour than accountants, those in the legal profession, consultants, engineers, physicians, pharmacists and dental practitioners, even once one controls for the characteristics of the individuals concerned.

It is also evident from Table 4 that female workers earn considerably less (up to 10% less) than male professionals, even when one takes account of individuals' characteristics, such as age and education. One might also expect that the relative position of women varies by type of occupation. We therefore estimate our preferred model (column 4 of Table 4) separately for men and women and the results are shown in Table 5. The base case for this regression is therefore all graduate workers. Many of the coefficients on the explanatory variables vary by gender. For example, the wage premium from age (seniority) is higher for male graduates than for women. However, again we focus our commentary on the occupation coefficients. The coefficients on the occupational variables suggest that male HE academics earn around 6% less than the average male graduate, even after controlling for education and other characteristics. This compares favorably to FE academics and to a lesser extent secondary school teachers. However, male accountants, consultants, engineers, pharmacists, dental practitioners, physicians, and those in the legal profession all earn a higher wage premium than male HE academics. Female HE academics earn a similar wage to the average female graduate, as do female FE academics and secondary school teachers. The occupational ranking for females is, however, similar to the ranking for men. Female HE academic wages compare poorly against all the other occupations listed.

Another issue that needs to be considered is the relative position of academics throughout their careers. Much of the public debate on academic salaries has suggested that academia is particularly unattractive later on in a person's career *(The Economist*, 'Its Own Reward', May 16th 2002). Stevens (2004) also found that unlike US academics, UK academics experience a relative decline in their salaries in later life. We address this issue directly by estimating our preferred model separately for different age groups; specifically we estimate three models for age ranges 30-39, 40-49 and 50 plus. These are shown in Table 6. Again some of the

explanatory variables have very different effects on hourly earnings at different ages. So, for example, young women (age 30-39) earn around 6% less than males. By contrast, older women (50 plus) earn approximately 17% less than their male counterparts, even after controlling for other characteristics such as ethnicity and education level.

Our primary interest in Table 6 is however, with the occupation variables. HE academics earn around 6% less than other graduates up to the age of 40. However, above the age of 40, the relative wage of HE academics rises to around the mean for all other graduates (the coefficient on the HE academics coefficient is insignificant in columns 2 and 3). This may suggest, contrary to the public perception of the problem, that older academics actually do relatively better than younger academics, at least compared to all other graduates. However, the coefficients are negative if not significant so we would not want to overly stress this result and in any case, in every age group, HE academics earn considerably less than most of the other occupational groupings listed, particularly physicians, dental practitioners, those in the legal profession and consultants. By contrast, FE academics and secondary school teachers do relatively poorly even compared to HE academics, particularly after the age of 40. There are substantial differences in the magnitude of the wage premium associated with each occupation across different ages. At the age of 30-39, the wage premium for those in the legal profession is around 18%, which is a 24% premium on HE academics. However, by age 40-49, the premium from being in a legal occupation has risen to 27%, compared to HE academics (and other graduates). Therefore the potential attractiveness of working in HE will vary according to both the specific occupation that one is making comparisons with, as well as the age range under consideration. Relative to many similar professions HE academics do not experience a major relative decline in their wages later in their careers, in contrast to the results from Stevens (2004).

The regressions described above give a clear indication of the ranking of different occupations and the wage premium associated with being an HE academic, both by gender and age. However, we are also interested in the extent to which we can explain gaps in pay between different occupations. To what extent is the relatively low pay experienced by a particular group down to the characteristics of that group or the fact that the same set of characteristics is rewarded less highly in that occupation. To answer this question we turn to the Oaxaca-Blinder decompositions (Blinder, 1973; Oaxaca, 1973). From the simplified standard regression below, where the wages of two groups j (HE academics and another

group) are determined by various explanatory variables *X*, with the usual error term.

$$w_j = X_j \beta_j + \varepsilon_j,$$
$$E(\varepsilon_j) = 0$$
$$j \in \{1,2\}$$

The conditional mean difference in the wages between the two groups *R* can be shown to consist of an explained difference (the first term in the model below), attributable to differences in the characteristics of the two groups, and an unexplained difference (the term in square brackets), attributable to different rewards to the two groups for the same characteristics. In this way we can measure the extent to which the relative pay position of HE academics is attributable to their different characteristics, as compared to other occupational groups, or due to the fact that they are rewarded differently for the attributes they possess.

$$R = \overline{w}_1 - \overline{w}_2 = (\overline{x}_1 - \overline{x}_2)' \beta^* + [\overline{x}_1'(\hat{\beta}_1 - \beta^*) + \overline{x}_2'(\beta^* - \hat{\beta}_2)]$$
$$\beta^* = \hat{\beta}_1, \hat{\beta}_2$$

The first decomposition compares all graduates with HE academics specifically. As Table 4 shows, graduates earn marginally more than HE academics after controlling for individual characteristics. When the difference in pay between these two groups is decomposed, the results indicate that HE academics have better endowments or characteristics than the average graduate. Thus HE academics should earn more than the average graduate, on the basis of their endowments (214.9% of the gap in pay between HE academics and all other graduates is attributable to differences in endowments between the two groups). In other words, the gap between HE academics and other graduates is largely down to an unexplained component (labeled discrimination in table 7). Thus HE academics would earn more as a result of their different (better) characteristics (they are older and more educated) but this is offset due to unexplained factors that reduce their wages. It is of course possible that this latter difference may be accounted for by unobserved ability differences between the two groups.

Table 7 also shows Oaxaca-Blinder decompositions for other specific occupations, particularly secondary school teachers and doctors. In the case of comparisons between

graduates and secondary school teachers, nearly 80% of the higher pay earned by graduates, as compared to secondary school teachers, is attributable to differences in the characteristics of the two groups. Only 20% of the pay gap is unexplained. Comparing graduates to physicians, around 17% of the pay gap between physicians and other graduates is down to differences in characteristics (physicians are more educated, for example). 83% of the difference is unexplained or down to the fact that physicians receive a higher price for the same set of characteristics as other graduates. Again it is possible that the unexplained gap is actually due to differences in unobserved abilities that mean that physicians would have earned higher wages anyway.

The final column in Table 7 compares the pay of doctors and HE academics directly. There is a considerable wage gap, with physicians much more highly paid than HE academics. 43.5% of this gap is attributable to differences in the characteristics between physicians and academics. Thus 56.5% of the pay gap between doctors and HE academics is unexplained or down to the fact that doctors earn a considerably higher premium for their endowments. This means physicians earn more than HE academics not only because they have superior endowments but also because they earn a higher price for the endowments that they do have. It is of course still possible however, that some of the unexplained wage differential is actually attributable to unobservable differences between doctors and HE academics.

Table 7 therefore suggests that more than half of the wage gap between doctors and HE academics is unexplained and also attributable to the fact that doctors appear to earn more for a given set of characteristics. This evidence is consistent with our main finding, namely that HE academics do relatively badly compared to the average graduate and they compare unfavourably to other, arguably more comparable, public sector workers who have a superior position *vis-à-vis* their ability to secure a higher price for their characteristics.

5.   Conclusions

This paper analyses the relative earnings of HE teaching professionals, as compared to a variety of different, arguably comparable, professions. It concludes that HE teaching professionals earn higher than average hourly earnings, as compared to all other workers,

although they also work longer hours than most. However, once one compares HE teaching professionals with graduates or other more similar occupations that require a substantial amount of postgraduate training, their relative economic position does not look good. In particular, the earnings of HE teaching professionals compare very poorly to accountants, those in the legal professions, consultants, engineers, physicians, pharmacists and dental practitioners (across both the public and private sectors). In our study, there were only two groups of workers that did worse than HE academics, namely FE academics and, to a lesser extent, secondary school teachers. These findings are obviously of great policy importance, from the perspective of the competitiveness of the HE sector in terms of attracting high quality individuals into the profession.

We investigated the sources of the overall gap in pay between different groups of workers. An interesting story emerges. Some predominantly public sector groups, such as physicians, have been particularly effective in securing higher pay overall and a higher price for their endowments. Thus, much of the gap between doctors and other graduates (and indeed between doctors and HE academics) is unexplained and down to the fact that physicians earn a higher price to their observed characteristics. This may be because physicians have unmeasured unobserved characteristics that tend to mean that their productivity and pay is higher, and that we have not been able to account for this in the model. However, it could also indicate that physicians have greater political and economic power and have therefore been able to negotiate a higher price for their endowments. Clearly in the case of doctors this may rightly reflect the higher value that society places on their skills. However, we found HE academics compared poorly not just to doctors but to a range of other professions, including lawyers, consultants and engineers. This maybe cause for concern if the UK aspires to maintain the quality of its world class HE sector by attracting the best individuals into the profession.

We also found that the economic position of HE academics varied over the life course, in terms of their relative wages. We found no evidence to support the conventional wisdom of a widening gap in pay between academics and other graduates as workers age. However, it is also apparent that the gaps in pay between HE academics and some other specific groups, such as doctors, do widen over the life course. Again, one's view of the evidence depends substantially on the comparator group under consideration. It is also worth noting that we were not able to take account of pension earnings associated with being an HE academic,

which may or may not reduce the lifetime earnings gap between HE academics and other professionals.

This paper provides evidence on the long run position of HE academics. Specifically, we investigated relative pay for HE academics over the previous decade. Whilst trends over time are accounted for in the regressions, we do not consider the changing nature of the gap over time. This is because small sample sizes preclude estimating an HE academic wage premium on an annual basis. Thus it is possible that within the decade considered in this paper, the relative position of HE academics improved (or deteriorated). In any case, this paper cannot address the question of whether the relative earnings position of HE academics has worsened over the last thirty or forty years or so, as has been argued by many commentators. This would obviously be central to any consideration of whether the quality of HE academics is likely to have declined over time due to falling relative wages.

Some additional caveats to the research are necessary. Firstly, the paper focuses on a specific group of HE workers, namely teaching professionals. Other workers in the HE sector, such as librarians, are not considered. Secondly, it was not possible to estimate the wage premium for HE teaching professionals by degree subject and by gender. Other descriptive evidence suggests that the relative position of academics in certain subjects, such as science and IT, may be much worse than described here. Unfortunately, given the limitations of the LFS data, there is no solution to this latter problem.

There are two questions that need to be addressed in future research. There may be substantial non-pecuniary benefits associated with being an HE academic and, in particular, greater flexibility in working patterns and higher job satisfaction. This study does not take account of these potential benefits associated with academe. One cannot assume however that being an HE academic is necessarily a 'good' job, in terms of the non-pecuniary benefits: this is an empirical question. We note in this study, for example, that HE academics work longer hours than many other professional groups (but not doctors), which may be considered a substantial disbenefit of the job. Clearly further research, incorporating other non-pay related dimensions of the job, is needed.

Lastly, further research is still needed to provide up to date and robust estimates of the relative pay of academics in the UK, as compared to the relative position of academics in

other countries. Certainly the market for top academics is international. To understand further the potential for a UK brain drain, as successful academics flock to the US for example, we need more evidence on relative academic salaries across a range of countries.

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Table 1:   Mean (log) wages 1994-2004 by occupation

	mean(log) wages	Std dev
Graduate	2.161	0.493
Academic (HE)	2.188	0.444
Academic (FE)	2.126	0.449
Secondary School Teachers	2.068	0.402
Accountants	2.265	0.469
Lawyers	2.326	0.510
Consultants	2.375	0.546
Engineer	2.110	0.421
Doctors	2.357	0.519
Pharmacist	2.218	0.424
Dentist	2.556	0.463

Source: LFS 1994-2004

Table 2: Average hours of work 1994-2004 by occupation

	Primary job (excl. unpaid overtime)	Secondary (excl. unpaid overtime)	Primary and Secondary (excl unpaid overtime)	Primary and Secondary (incl. overtime paid and unpaid)
Graduate	34.2	0.7	34.9	42.2
Academic (HE)	34.3	2.6	36.8	44.0
Academic (FE)	30.0	1.9	31.9	38.5
Secondary School Teachers	31.5	0.9	32.4	43.7
Accountants	34.7	0.5	35.1	41.3
Lawyers	34.2	0.3	34.5	41.7
Consultants	34.2	0.3	34.5	40.8
Engineer	36.1	0.2	36.4	42.3
Doctors	39.2	1.9	41.1	52.3
Pharmacist	34.0	1.7	35.8	38.0
Dentist	31.0	0.6	31.6	35.6

Source: LFS 1994-2004

Table 3 Average hours of work, over time, by occupation, 1994-2004

	Academics (HE)	Teachers (Secondary)	Doctors	Graduates	Public Sector Graduates	Graduates v HE Academics	Public Sector Graduates v HE Academics
1994-95	46.85	45.11	59.41	44.28	44.54	2.57	2.31
1996-97	46.63	46.08	58.94	44.66	44.84	1.97	1.79
1998-99	48.74	46.59	58.99	44.57	45.38	4.17	3.36
2000-01	49.13	47.73	56.81	44.62	45.46	4.51	3.67
2002-03	49.29	47.85	53.09	44.39	44.99	4.90	4.30
2004	47.38	47.12	51.62	44.32	44.76	3.06	2.62

Source: LFS 1994-2004; *Note:* Sample working in excess of 25 hours per week i.e. excluding part-time workers

Table 4 The wage premium associated with HE academic and other professions

Dependent variable: ln(wages per hour)		(i) All Occupations (Excl. Education)		(ii) All Occupations (Incl. Education)		(iii) Public Sector (Graduates)		(iv) Graduates	
		Coeff	tstat	Coeff	tstat	Coeff	tstat	Coeff	tstat
Demographics									
Age	Age: 30-39	0.1591	(65.73)	0.1800	(77.84)	0.2112	(27.80)	0.2490	(48.96)
Ref 20-29 years of age	Age 40-49	0.1450	(55.40)	0.1983	(78.69)	0.2609	(33.07)	0.2784	(48.19)
	Age 50+	0.0693	(24.97)	0.1653	(59.60)	0.2943	(32.01)	0.2745	(37.96)
Sex	Female	-0.1111	(60.22)	-0.1177	(66.21)	-0.0718	(12.57)	-0.0867	(20.41)
Ethnicity	Mixed Race	-0.0896	(10.82)	-0.0686	(8.68)	-0.0608	(2.34)	-0.1287	(6.66)
Ref: white	Asian or Asian British	-0.1069	(15.27)	-0.1029	(15.99)	-0.0904	(4.76)	-0.0988	(7.78)
	Chinese	0.0053	(0.24)	-0.0489	(2.33)	-0.1671	(4.03)	-0.1137	(3.81)
	Black of Black British	-0.0476	(4.58)	-0.0314	(3.13)	-0.0583	(2.18)	-0.0802	(4.04)
	Other Ethnic Group	-0.2468	(17.18)	-0.2119	(15.35)	-0.0761	(1.47)	-0.1878	(4.69)
Marital Status	Unmarried	0.0671	(34.50)	0.0750	(41.11)	0.0558	(9.65)	0.0968	(22.38)
Degree	Medicine			0.1260	(29.03)	0.0501	(4.56)	0.0405	(4.14)
Subject	Biology-Agriculture-Phisics			0.0922	(14.66)	-0.0020	(0.20)	0.0095	(1.33)
Ref: is non-gratuate	Maths-Engineering-Architecture			0.1615	(29.87)	0.0613	(5.07)	0.0784	(11.58)
except in graduate only	Social Sciences			0.1467	(29.51)	0.0391	(4.29)	0.0332	(5.27)
regressions where	Humanities & Arts			0.0085	(1.29)	-0.0348	(3.54)	-0.0683	(9.35)
unclassifed degrees	Education			0.0222	(3.24)	-0.0202	(2.35)	-0.0415	(5.48)
are the reference group	Other Subjects			0.0781	(5.73)				
Education	Doctorate			0.4420	(44.48)				
Ref is unqualified	Masters			0.4013	(72.46)	0.0056	(0.41)	-0.0111	(1.06)
except in graduate only	Other Postgraduate			0.3323	(43.68)	-0.1146	(7.78)	-0.1353	(11.36)
regressions where	Degree			0.3820	(97.11)	-0.0726	(5.65)	-0.0839	(8.71)
doctorate is the	High Qualification			0.3333	(93.63)				
reference group.	Higher Vocational			0.2774	(80.49)				
	Mid Vocational			0.1000	(22.23)				
	Vocational			0.0473	(10.54)				
	A level(s)			0.3242	(81.21)				
	GCSE(s)			0.1456	(59.04)				
Specific Occupations	Academics (Higher Education)	0.2364	(20.54)	0.0273	(2.79)	-0.0329	(1.64)	-0.0305	(2.30)
Ref other occupations	Academics (Further Education)	0.1442	(12.67)	0.0285	(2.60)	-0.0556	(3.73)	-0.0631	(4.45)
	Teachers (Secondary)	0.1500	(28.54)	0.0252	(4.55)	-0.0204	(2.85)	-0.0301	(4.43)
	Accountants	0.4006	(47.27)	0.2315	(26.59)	0.2361	(7.99)	0.1731	(12.35)
	Solic & Lawyers, Judges & Coroners	0.4712	(35.34)	0.2368	(16.92)	0.3171	(8.53)	0.1994	(12.30)
	Consultants	0.4729	(33.03)	0.2846	(20.15)	0.1703	(4.47)	0.1431	(13.69)
	Engineers	0.2680	(50.17)	0.0913	(16.68)	0.0725	(3.44)	0.0140	(1.58)
	Doctors	0.4147	(35.08)	0.2608	(21.24)	0.2279	(13.39)	0.2114	(13.04)
	Pharmacists & Pharmacologists	0.3940	(17.85)	0.1696	(7.98)	0.1614	(3.98)	0.1467	(6.09)
	Dental Practitioners	0.6322	(12.12)	0.4129	(8.33)	0.4638	(8.92)	0.4648	(9.60)
Public/Private	Public	0.0960	(46.64)	0.0263	(13.09)			-0.0618	(13.35)
Constant		1.6504	(183.84)	1.4339	(153.15)	1.8500	(55.89)	1.9295	(76.89)
Regional dummies		YES		YES		YES		YES	
Year dummies		YES		YES		YES		YES	
Quarter dummies		YES		YES		YES		YES	
No. obs		260,484		260,484		22,921		50,788	
R^2		0.172		0.274		0.196		0.156	

Source: LFS (1993 Q4 -2005 Q3). *Notes:* 1. Robust t-statistics in parentheses; 2. The dependent variable is the sum of primary and secondary occupations net wages per hour. Details of the LFS variables used to construct the dependent variable as well as qualification and occupational groups and the classification of regions are detailed in Appendix I; 3. The temporal stability of the characteristic coefficients was confirmed by the use of Chow testing on adjacent years.

Table 5: The wage premium associated with being a HE academic and other professions by gender

Dependent variable: ln(wages per hour)		(i) Graduates MALE		(ii) Graduates FEMALE	
		Coeff	tstat	Coeff	tstat
Demographics					
Age	Age: 30-39	0.2598	(36.10)	0.2373	(32.87)
Ref 20-29 years of age	Age 40-49	0.3173	(38.94)	0.2286	(27.94)
	Age 50+	0.3194	(31.34)	0.2126	(21.04)
Ethnicity	Mixed Race	-0.1819	(6.46)	-0.0791	(3.04)
Ref: white	Asian or Asian British	-0.1039	(6.32)	-0.0865	(4.35)
	Chinese	-0.1685	(4.41)	-0.0386	(0.84)
	Black of Black British	-0.0761	(2.48)	-0.0813	(3.21)
	Other Ethnic Group	-0.1667	(2.62)	-0.2201	(4.80)
Marital Status	Unmarried	0.1224	(19.94)	0.0594	(9.75)
Degree	Medicine	0.0758	(2.75)	0.0218	(0.96)
Subject	Biology-Agriculture-Phisics	0.0463	(2.03)	-0.0260	(1.17)
	Maths-Engineering-Architecture	0.1070	(4.80)	0.0568	(2.36)
	Social Sciences	0.0764	(3.39)	0.0014	(0.06)
	Humanities & Arts	-0.0607	(2.58)	-0.0675	(3.14)
	Education	-0.0246	(1.02)	-0.0493	(2.28)
	Other Subjects				
Education	Masters	-0.0076	(0.58)	-0.0211	(1.14)
Ref is doctorate	Other Postgraduate	-0.1383	(8.39)	-0.1435	(7.42)
	Degree	-0.0766	(6.46)	-0.0974	(5.63)
	Academics (Higher Education)	-0.0570	(3.25)	0.0150	(0.74)
	Academics (Further Education)	-0.1140	(5.31)	-0.0114	(0.61)
	Teachers (Secondary)	-0.0749	(7.15)	0.0117	(1.32)
	Accountants	0.1228	(7.32)	0.2601	(10.56)
	Solic & Lawyers, Judges & Coroners	0.1322	(5.90)	0.2703	(11.73)
	Consultants	0.2363	(10.48)	0.2519	(8.89)
	Engineers	-0.0012	(0.12)	0.0834	(3.14)
	Doctors	0.1796	(7.78)	0.2537	(10.48)
	Pharmacists & Pharmacologists	0.0648	(1.64)	0.2004	(6.67)
	Dental Practitioners	0.4386	(6.61)	0.4806	(6.82)
Public/Private	Public	-0.0737	(11.13)	-0.0332	(5.07)
Constant		1.8960	(56.25)	1.9189	(26.35)
Regional dummies		YES		YES	
Year dummies		YES		YES	
Quarter dummies		YES		YES	
No. obs		28,325		22,463	
R^2		0.222		0.193	

Source and notes: See Table 3.

Table 6   The wage premium associated with being a HE academic and other professions by age group

Dependent variable: ln(wages per hour)		(i) Graduates 30-39		(ii) Graduates 40-49		(iii) Graduates 50+	
	Cohort						
Demographics							
Sex	Female	-0.0620	(8.20)	-0.1382	(15.97)	-0.1708	(13.45)
Ethnicity	Mixed Race	-0.1507	(5.01)	-0.1391	(3.70)	-0.1774	(2.10)
Ref: white	Asian or Asian British	-0.1146	(5.50)	-0.1513	(4.73)	-0.1696	(3.67)
	Chinese	-0.1154	(2.40)	-0.1604	(2.39)	-0.4176	(7.01)
	Black of Black British	-0.0973	(2.90)	-0.0953	(2.06)	-0.0827	(1.17)
	Other Ethnic Group	-0.2627	(5.51)	-0.1506	(2.14)	0.0040	(0.03)
Marital Status	Unmarried	0.0927	(13.09)	0.0533	(5.95)	0.0551	(4.10)
Degree	Medicine	0.0138	(0.46)	0.0531	(1.39)	0.0389	(0.75)
Subject	Biology-Agriculture-Phisics	-0.0047	(0.17)	0.0282	(0.80)	0.0212	(0.47)
Ref: unclassifed	Maths-Engineering-Architecture	0.0663	(2.43)	0.0773	(2.18)	0.0687	(1.52)
degrees	Social Sciences	0.0355	(1.32)	0.0394	(1.12)	0.0512	(1.15)
	Humanities & Arts	-0.0813	(2.92)	-0.0424	(1.18)	-0.0781	(1.75)
Education	Education	-0.0504	(1.77)	-0.0258	(0.73)	-0.0239	(0.54)
Ref: doctorate	Masters	-0.0119	(0.66)	-0.0040	(0.22)	-0.0184	(0.71)
	Other Postgraduate	-0.1464	(7.13)	-0.1369	(6.47)	-0.1278	(4.22)
	Degree	-0.0806	(4.97)	-0.0786	(4.58)	-0.0929	(3.84)
	Academics (Higher Education)	-0.0654	(2.80)	-0.0268	(1.21)	-0.0527	(0.00)
	Academics (Further Education)	-0.0587	(2.18)	-0.0763	(3.43)	-0.0714	(2.45)
	Teachers (Secondary)	-0.0037	(0.28)	-0.0429	(3.70)	-0.0630	(4.27)
	Accountants	0.1453	(6.77)	0.1818	(5.14)	0.1594	(1.98)
	Solic & Lawyers, Judges & Coroners	0.1795	(7.22)	0.2758	(5.88)	0.2710	(4.41)
	Consultants	0.2313	(8.26)	0.2420	(6.62)	0.2472	(2.91)
	Engineers	0.0023	(0.15)	-0.0118	(0.62)	0.0261	(0.91)
	Doctors	0.2259	(8.08)	0.3219	(11.01)	0.3186	(6.27)
	Pharmacists & Pharmacologists	0.1275	(2.98)	0.1187	(2.85)	0.1874	(2.35)
	Dental Practitioners	0.5474	(6.26)	0.5371	(4.83)	0.4363	(5.73)
Public/Private	Public	-0.1123	(14.04)	-0.0691	(7.37)	0.0146	(1.07)
Constant		2.2820	(54.24)	2.1933	(43.94)	2.2759	(30.67)
Regional dummies		YES		YES		YES	
Year dummies		YES		YES		YES	
Quarter dummies		YES		YES		YES	
No. obs		16,822		11,922		6,972	
R^2		0.164		0.175		0.147	

Source and notes: See Table 3.

Table 7 Oaxaca-Blinder decompositions

Summary of decomposition results (as %)	(i) Graduates vs HE academics	(ii) Graduates vs. secondary school teachers	(iii) Graduates vs.. doctors	(iv) Doctors vs HE academics
Amount attributable:	-11.9	6.1	-48.4	36.5
due to endowments (E):	-6.6	7.5	-3.3	7.2
due to coefficients (C):	-5.2	-1.4	-45.1	29.3
Shift coefficient (U):	8.8	3.4	28.7	-19.9
Raw differential (R) {E+C+U}:	-3.1	9.5	-19.7	16.6
Adjusted differential (D) {C+U}:	3.6	2	-16.4	9.4
Endowments as % total (E/R):	214.9	79.4	17.0	43.5
Discrimination as % total (D/R):	-114.9	20.6	83.0	56.5

Note: These Oaxaca-Blinder decompositions are derived from regressions as shown in Table 4.

Technical Information

This appendix details the derivation of the LFS variables listed below, with variable names given in brackets.

The dependent variable, net wages per hour, is the sum of primary (*netwk*) and secondary (*netwk2*) occupations net wages divided by actual hours worked (*acthr* and *acthr2*).

Degree subject classifications (*sngdeg*) are consistently defined in to the aggregated groups to account for definitional changes that occurred in 2004. The variable is referenced against those without degree subjects. In the models where the sample contains academics or graduates it is referenced against those individuals who do not specify subject areas.

Educational qualification groups represent the 'highest qualification' obtained by each individual in the sample. These qualifications are, with the exception of vocational training, self-explanatory. High Vocational includes RSA High, Candg hghi, ONDBTEC, NVQ3; Mid Vocational includes Apprenticeship, Candg med, BTECdice, NVQ2; Vocational includes Candg (low), RSA (low), NVQ1, other vocational qualification. "Higher qualification" includes nursing, hediplom, otherhe and teaching unless degree. Graduates include all those with undergraduate or postgraduate tertiary qualifications. The educational variable classifications are consistently defined over time to account for changes in classifications that occurred over the sample period examined. The code used in generating these definitions is available from the authors on request.

Occupation groups are derived from the more general SOC1 variable (*sc2kmmj*) that sub-divides occupations into nine occupational groups. Specific occupational groups are derived from the SOC2 variable (*soc2km*). Academics working in Higher Education [higher education teaching professionals (*soc2km==2311*)], and those in further education [further education teaching professionals (*soc2km==2312*)], are analysed separately with the relevant classifications codes being give in brackets. All of the individual groups are contained with the 'Professional Occupations' classification (*sc2kmmj* for the value 2). Engineers are classified as civil engineers (*soc2km==2121*); mechanical engineers (*soc2km==2122*);

mechanical engineers (*soc2km==2123*); electronics engineers (*soc2km==2124*).

Regional dummies are determined by geographical groupings of administrative regions where residents usually reside (*ureg*). The specific regions being: Northern; Yorkshire & Humberside; East Midlands; London; East Anglia (excluding Greater London); South West; West Midlands; North West; Wales; Scotland and N Ireland.