Manpower®

CENTRE for ECONOMIC PERFORMANCE

Manpower Human Resources Lab

Overqualification, Job Dissatisfaction and Increasing Dispersion in the Returns to Graduate Education

Francis Green & Yu Zhu

MHRLdp005
November 2007

THE LONDON SCHOOL OF ECONOMICS AND POLITICAL SCIENCE

MANPOWER HUMAN RESOURCES LAB, CEP

As one of the world's foremost employment agencies, Manpower is seeking to contribute to the analysis of and policy debate around the issues of the changing world of work. In May 2006 it therefore established with the Centre for Economic Performance the Manpower Human Resources Lab at the London School of Economics. The aim of the Lab is to become a leading centre studying the impact of human resource decisions and labour market trends on productivity at firm, national and global levels.

SENIOR STAFF

Prof. Stephen Machin, FBA	Director MHRL & Research Director, CEP
Alex Bryson	Manpower Research Fellow, CEP
Professor Richard Freeman	Director, Labour Studies Programme NBER & Senior Research Fellow CEP
Tony Glassborow	Human Resources Director, EMEA Manpower Inc
Prof. Alan Manning	Director, Labour Markets Programme CEP
Prof. John Van Reenen	Director, Centre for Economic Performance
Jo Cantlay	Administrator

CONTACT US

Website: www.lse.ac.uk/manpower

Postal address: Manpower Human Resources Lab
Centre for Economic Performance
London School of Economics
Houghton Street
London WC2A 2AE

Email: j.m.cantlay@lse.ac.uk

Telephone: +44 (0) 20 7955 7285

Overqualification, Job Dissatisfaction, and Increasing Dispersion in the Returns to Graduate Education

by Francis Green * and Yu Zhu *

ABSTRACT

Increasing dispersion in the returns to graduate education is found, using quantile regression. This trend is related to rising overqualification. We distinguish between and validate measures of "Real" and "Formal" overqualification, according to whether it is or is not accompanied by underutilisation of skill; and using a unique data series in Britain we report the trend in overqualification types between 1992 and 2006. The distinction between types is relevant because employees in the Real Overqualification group experience greater, and more sharply rising, pay penalties than those in the Formal Overqualification group. Real Overqualification, but not Formal Overqualification is associated with job dissatisfaction. Formal Overqualification has been increasing over time, and in 2006 characterised nearly one in four graduates. Real Overqualification has been steady or rising only slowly; in 2006 it affected less than one in ten graduates. Conditioning on graduates being matched to graduate jobs, it is found that there is no significant increase in the dispersion of returns to graduate education. The normative implication drawn is that the state should provide regular public information on the distribution of the returns to graduate education.

Acknowledgement: We thank our colleague Amanda Gosling for helpful comments. We are grateful for the support of the Economic and Social Research Council; co-funding for the 2006 Skills Survey was also provided by: the Department for Education and Skills, the Department for Trade and Industry, the Learning and Skills Council, the Sector Skills Development Agency, Scottish Enterprise, Future Skills Wales, the East Midlands Development Agency, Highlands and Islands Enterprise and the Department for Employment and Learning (Northern Ireland).

Keywords: pay, job satisfaction, job dissatisfaction, overeducation, overqualification, skill utilisation, returns to college education, returns to graduate education.

* Department of Economics, University of Kent.

EXECUTIVE SUMMARY

1 Introduction

The period between 1989 and 1995 saw a sea-change in the proportion of school-leavers participating in higher education in Britain. As a result, the share of graduates in the labour force grew rapidly, the supply of female graduates in particular appearing to accelerate after 2002 (Figure 2).

Figure 2 Share of Graduates in the Labour Force.

Proportion of 25-60 Year-Old Workforce with NVQ 4+

Till recently only small signs of departure from the high returns to graduate education have been detected, leading researchers to conclude that the new graduates were being successfully integrated into the labour market. Nevertheless, it has been recognised that the graduate labour market is becoming increasingly heterogeneous (Elias and Purcell, 2004), and the picture may be changing quite rapidly. In this paper we analyse the returns to graduate education up to 2006, with a focus on their dispersion.

2 Increasing Dispersion.

Instead of assuming that graduate education benefits all students equally, we use quantile regression to see how the link between graduate education and pay differs across the population. We can rank employees according to the distribution of “residuals” attributable to those unobservable factors which affect pay, even though by definition we do not know what the unobservable factors are. Then, we can estimate the association of graduate education with pay for those who are ranked (from lower to

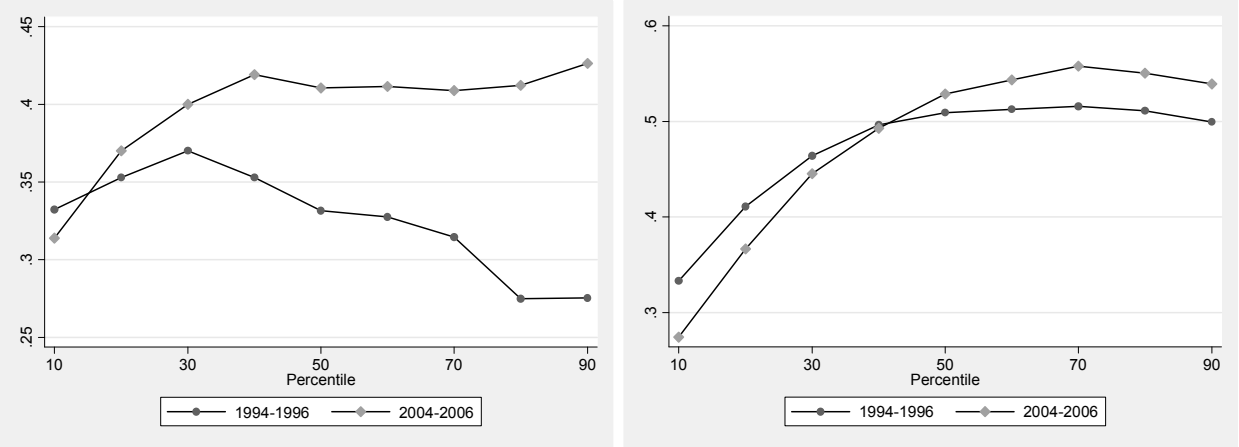
higher) at the 10th, 20th, 30th etc percentiles in this distribution. The dispersion we discuss in this paper refers to the differences between the findings at the different percentiles (or quantiles).

The quantile regression estimates (Figure 3) show that for both men and women the dispersion in the returns to graduate education increased between 1994 and 2006. For men, the returns at the 30th and higher quantiles increased significantly between 1994-6 and 2004-6, while at the 10th quantile the point estimate of the returns decreased by a small amount. Over the period the gap between the returns at the 90th and 10th quantiles rose from -0.06 to 0.11 log points. For women, the gap rose from 0.17 to 0.27 log points. Though other changing factors will have contributed, Figures 3a and 3b present a crude "before and after" picture of the effects of the participation surge on the dispersion of returns to graduate education.

The rest of the paper offers an interpretation of this increasing dispersion in terms of overqualification, defined as being in a job that does not require a graduate-level qualification on entry.

Figure 3 Quantile Regression Estimates of Returns to Graduate Education 1994-6 and 2004-6

a. Men **b. Women**



3 The Growth of Overqualification

Using data from a series of Skills Surveys, we find that:

- In the case of men, overqualification increased steadily over the period, rising overall from 21.7% in 1992 to 33.2% in 2006. For women, overqualification rose overall by a similar amount, from 23.8% to 32.1%; the increase came through a leap in the current decade, following stability in the 1990s.
- The above rise included a substantial rise in “Formal Overqualification”, whereby graduates are overqualified but do not perceive that they are under-utilising their skills. But there was only a small and insignificant rise in “Real Overqualification”, in which overqualified graduates do report underutilising their skills at work.
- Successive cohorts of graduates are found to be more overqualified than previous ones.

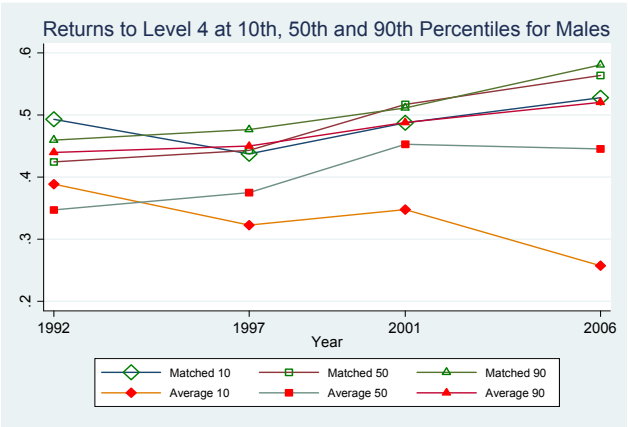
4 Overqualification matters for individuals

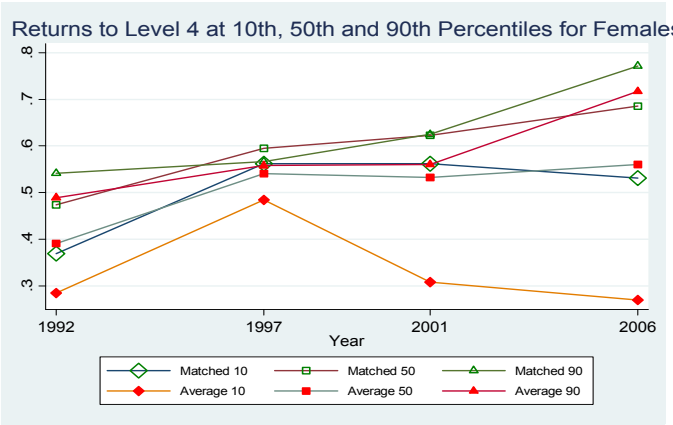
- For men, the estimated loss of pay from overqualification compared to being in a graduate-level job was already substantial, at 0.28 log points (32%) in 1992. The penalty remained at similar levels in 1997 and 2001, but rose significantly and substantially to 0.40 log points in 2006. For women, the penalty rose substantially between 1997 and 2001, and yet more to 2006 when it reached 0.45 log points. In short, for both men and women, there has opened up a sharp increase in the penalty for being overqualified in the first part of the current decade.
- In all years Real Overqualification has a substantially greater pay penalty than Formal Overqualification. However, both types of overqualification are associated with a sharply increasing pay penalty in recent years.
- There is a substantial negative impact of Real Overqualification on job satisfaction. For men the impact increased significantly between 1992 and 2001. In 2006 22% of the graduates in this category were dissatisfied with their job, compared with 7% of matched graduates. For women, Real Overqualification has been a substantial source of dissatisfaction according to both measures in all years examined, and its impact appears not to have changed significantly.
- For both sexes, there is no significant link between Formal Overqualification and job dissatisfaction. Because Formal Overqualification is the largest category of overqualification, the aggregate implications of rising overqualification for job

dissatisfaction are relatively limited, and may have been overstated in previous research.

5 Overqualification and Dispersion

After controlling for whether graduates are in jobs requiring graduate-level qualifications, there is found to be no increase in the dispersion of the returns for men, and for women substantially less than is the case with the "average" returns calculated without regard to overqualification. We conclude that the increasing dispersion between the returns to graduate education at different quantiles of the residual pay distribution is strongly, and in the case of men wholly, associated with the increasing prevalence of overqualification among graduates.





6 Conclusion

The policy implications of increased dispersion and rising overqualification are briefly reviewed. First, we confront a possible false conclusion, drawn by some when there is discussion of overqualification, that graduate education participation is too high. Second, we note that rising dispersion may lead to greater risk, which could deter some prospective students from enrolling, thereby affecting the achievements of participation targets. Finally, the main normative implication from our findings is that efforts should be devoted to improving information flows to prospective students about the level and dispersion of returns. We recommend that the returns to graduate education be published annually by the National Office for Statistics.

Overqualification, Job Dissatisfaction, and Increasing Dispersion in the Returns to Graduate Education

Francis Green

Yu Zhu

1 Introduction

The idea behind this paper is that the concept of "overqualification", or "overeducation", provides a way of describing, and thereby helping to understand, trends in the relationship between education and the labour market.[1] Specifically, the focus is on the evolution of the returns to graduate-level educational qualifications through the period of rapid expansion in tertiary education that occurred in Britain during the early 1990s.[2]

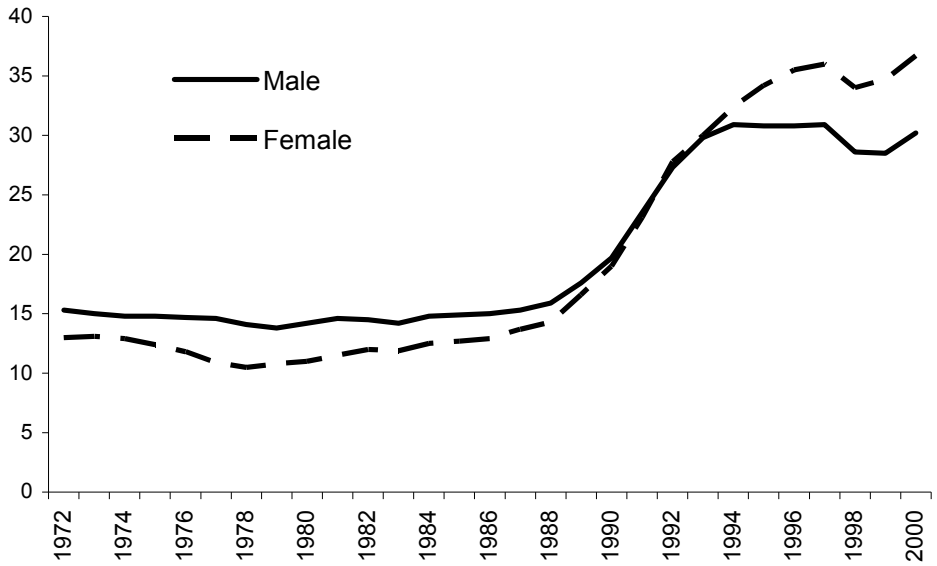
Despite substantially increased tertiary educational achievements in the British workforce, the returns to graduate education over the 1980s and 1990s were always high and either increasing or stable (Machin, 2003). The persistence of high returns during that time of rising supply is usually taken, using simple supply and demand equilibrium theory, as implying that there must have been equally rapidly rising skills demand. The question as to how the economy reacts to increased graduate education did not, however, disappear with such findings. The period between 1989 and 1995 saw a sea-change in the proportions of school-leavers participating in higher education (Figure 1). By the early part of the current decade several years of the now-larger graduate cohorts had entered the labour force, replacing retiring cohorts with very much lower levels of educational achievement. The proportion of graduates in the labour force grew rapidly, the supply of female graduates in particular appearing to accelerate after 2002 (Figure 2). Three studies find suggestive evidence of modestly declining returns in recent years, while demonstrating that the average returns to graduate education remain high (Elias and Purcell, 2005; Walker and Zhu, 2007; and Sloane, 2003).

Studies of the returns to education typically pay little heed to demand-side factors, presumably under the implicit assumption that labour markets are competitive. Yet the characteristics of the jobs where graduates are being employed may become increasingly relevant for explaining the returns, following the surge in participation. According to Elias and Purcell (2004), for example, the graduate labour market is becoming increasingly diverse, with graduates and their skills being taken up in new

[1] We treat "overqualification" and "overeducation" as synonymous terms; authors occasionally use the term "underemployment" in the same sense, though this term has wider meanings also.
[2] Throughout this paper, we refer to "graduate education", meaning education leading to a qualification at level 4 or above in the English system of qualifications. Level 4 includes both academic undergraduate degrees and vocational qualifications at this level.

and niche occupations (Elias and Purcell, 2004). The pay normally attached to these occupations directly affects the returns achieved. One useful way of bringing in the demand side is through the concept of overqualification.

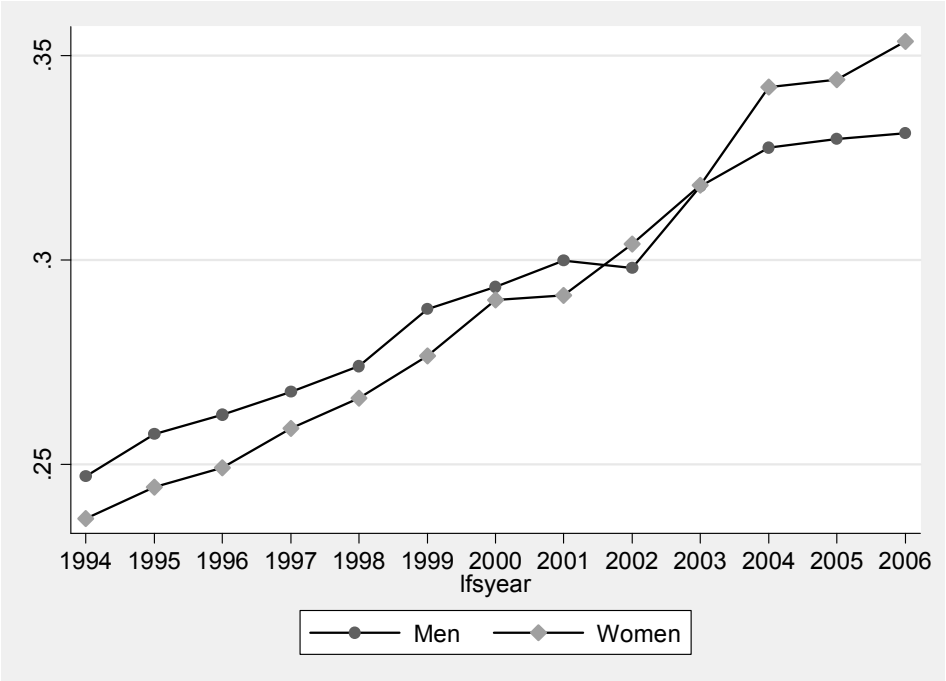
Figure 1 Age Participation Index 1979-2000



Source: www.dfes.gov.uk/economicbenefit/docs/Eco_Social%20Text.pdf. Proportion of 18-21 year-olds engaging in at least some HE experience.

Figure 2: Share of Graduates in the Labour Force.

Proportion of 25-60 Year-Old Workforce with NVQ 4+



Hitherto, studies of overqualification have had little or nothing to add to research on the changing returns to education. First aired by Freeman (1976) in respect of the United States in the 1970s, “overqualification” is now most widely interpreted as referring to a state of disequilibrium, whereby workers possess excess educational qualifications relative to those their jobs require. But conceptual ambiguity, and a scarcity of consistent time-series data and of longitudinal survey evidence, have inhibited the development of a scientific consensus. A meta-analysis of multiple studies found little evidence of any growth in overqualification (Groot and van den Brink, 2000), though Felstead et al. (2002) show that there had been a long-term growth in Britain. There is little evidence available as to how the costs of overqualification may have been changing; a recent exception is the study of Chevalier and Lindley (2007), which found that, although after the tertiary expansion in Britain in the early 1990s overqualification approximately doubled, the negative impact of overqualification on pay remained unaltered when comparing 1996 with 2002. From this finding they concluded that the labour market was largely able to accommodate the expansion of higher education graduates over this PERIOD.

This paper contributes to understanding of the recent graduate labour market in five distinct ways, making use of a unique series of survey data. After confirming that the returns to graduate education for women were positively correlated with residuals for earnings regressions (as shown for both sexes combined in Martins and Pereira, 2004), our first new contribution is the finding that this dispersion of returns substantially increased for both men and women over the period 1994 to 2006. While the benefits of graduate education at the top end of the residual wage distribution have increased a little, at the bottom end they have sharply decreased. Second, the paper reports the long-term trend in overqualification on a consistent basis from 1992 until 2006. While for the most part the paper will focus on the graduates of tertiary education (which we term “graduates” for short), the paper reports trends in overqualification both for graduates and for all employees. One reason for examining all workers is that graduates of tertiary education, if overeducated, might take up jobs that would otherwise be matched to secondary school graduates (A-level equivalent), and thereby stimulate overqualification at this lower level also, and so on down the education spectrum – a process sometimes unceremoniously termed “bumping down”. If so, a comprehensive picture of change

requires us to take a look at overqualification at all levels. A clear upward trend in overqualification is found, both for graduates and for all employees. Moreover, we find that successive cohorts are more overeducated than their predecessors.

Third, we introduce and validate a new method of classifying overqualification, according to whether overqualification is accompanied by perceived skills mismatch as directly reported by employees. We seek validity for this new classification by examining its association with several measures of job skill and related job characteristics. The fourth new contribution of the paper is to estimate the personal costs of the different types of overqualification in terms of lost pay and job dissatisfaction, and to show how these costs have evolved during the period of tertiary education expansion. We find that there has been a sharp increase during the current decade in the financial costs of being overqualified, but that the dissatisfaction which results from overqualification did not significantly deteriorate. Finally, the paper illustrates how the trend in overqualification and its personal costs is linked with the increasing dispersion in the educational returns for graduates in the last decade.

After a brief review of relevant previous studies, Section 2 presents quantile regression estimates of the returns to graduate education over the recent decade. Section 3 considers the relevance of previous studies of overqualification and its effects. Section 4 describes the data series, and Section 5 lays out findings pertaining to the growth of overqualification and its effects. Section 6 concludes with a discussion of the implications for education policy, and includes a recommendation that the state's statistical office should publish estimates of the variable returns to graduate education on an annual basis.

2 Dispersion in the Returns to Graduate Education

As the British Government's "Inquiry" into higher education (Dearing, 1997) concluded in 1997, partaking in higher education at that time was an excellent personal investment, having an estimated annual private return of between 11% and 14%; see also Blundell et al. (2000). The returns then were greater for women than for men, and

had increased significantly since the 1970s and 1980s. Through the 1990s the returns to higher academic education continued to rise, though this was balanced by some falls in the returns to higher vocational qualifications (Machin, 2003). In-depth case study work in three sectors during 1999-2000 also supported the view that the skills of graduates then being employed in non-traditional graduate jobs were being used to a considerable extent, despite evidence of some underemployment and limitations to the expansion of graduate skills demand (Mason, 2002). Overall, the maintenance through the 1990s of a substantial return to tertiary qualifications is taken as testimony to sustained demand in the face of rising supply, at least until the end of the decade. The most far-reaching study of the integration of higher education and employment up to 2002 drew on a sample cohort of 1995 graduating students re-interviewed seven years after graduation. Elias and Purcell (2004) identify a set of 'new' and 'niche' graduate occupations, outside the traditional professional and higher managerial jobs that required degrees for entry.[3] They found that these jobs tended to require at least some of the skills normally associated with graduates, and conclude on balance that the new and niche jobs were generating sufficient demand for the skills of the newly enlarged cohort of 1995. Chevalier and Lindley (2007), using the same data, find that the penalty for being overeducated did not increase compared with an earlier cohort of 1990 graduates. Up to 2002, then, there appears to be little or no evidence of declining returns to graduation following the surge in participation.[4]

However, studies that go beyond 2002 have unearthed suggestive evidence of modestly declining wage premia for graduates (Purcell et al., 2005; Walker and Zhu, 2007; Sloane, 2005). Purcell et al. (2005) call for a more disaggregated analysis, given that the graduate labour market is becoming more diverse, a view with which we fully agree. One way of capturing diversity uses quantile regression techniques to examine the heterogeneous effects of education at different points in the residual wage distribution. Martins and Pereira (2004) find that, in several European countries (including the UK) during the mid 1990s, returns to education at the upper quantiles significantly exceeded those at lower quantiles. This they attribute to any of three

[3] These new occupations nevertheless had previously tended to require other post-secondary, often vocational, qualifications – an example is nursing.

[4] This optimistic economic picture of the integration of graduates contrasts with some sociological research on the consequences of rising higher education participation, which has highlighted the contradictory responses of recruiters as they try to identify the most talented graduates and channel them into fast-track careers (Brown and Hesketh, 2004).

explanations: overqualification, complementarity between schooling and unobserved ability, or complementarity between school quality and the residual earnings distribution.[5]

As Elias and Purcell (2004) show, it is only after about 5 years that almost all graduates who are going to will have found their way into graduate jobs. Given also the cumulative impact on graduate stocks of the accelerated flows of new graduates in the early 1990s, it becomes important to take the analysis of the effects over the long term and as up to date as possible. We begin, therefore, by examining both the level and the dispersion of returns to graduate education for a period of just over a decade. We take 1994 as the starting point, restricting the sample to those over 25, thereby including only those who graduated before the surge in higher education. By 2006, all those graduating during the surge and for five years after will have entered the working population and have had at least five further years to become integrated.

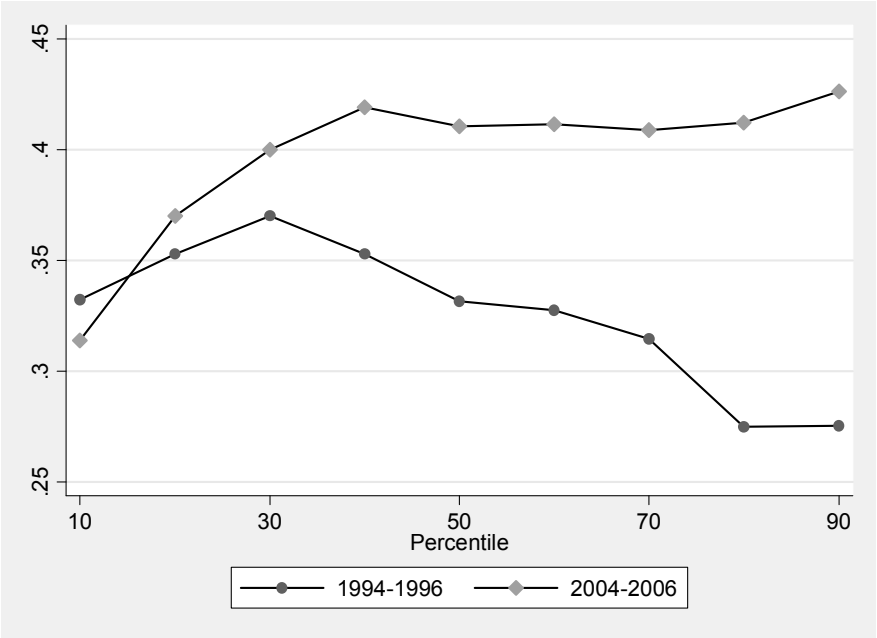
Figures 3a, 3b, 4a and 4b plot quantile regressions estimates of the returns to graduate education in Britain, using consistent data on employees taken from the UK Quarterly Labour Force Survey, 5th wave only. The estimates give the log pay increase associated with the difference between achieving GCSE Grades A-C or equivalent (Level 2) and graduating from tertiary education with at least a college degree or professional qualification (Level 4+).[6]

Figure 3b shows that for women, both at the start and at the end of the period, the returns to graduate education are notably greater at higher quantiles. In 1994-1996, for example, at the 90th quantile the return on log hourly pay for men was 0.333 (a 39% pay premium); this compares with 0.500 at the 90th quantile. This pattern is consistent with that reported by Pereira and Martins (2004), applied to the returns to schooling. The interpretation to be placed on the monotonically increasing returns across quantiles is that there is a complementarity between the effect of education on pay and the impact of whatever contributes to the residuals. Typically, in the human capital framework, the residuals are seen as capturing unobserved ability; hence it is inferred that graduate

[5] Another indication of diversity is that both subject matter and degree classification have been found to significantly affect the returns to getting a degree (Walker and Zhu, 2007; Bratti et al., 2006).
[6] We chose Level 2 as our comparator in order to give the return associated with staying in education after 16, following through and completing tertiary education. The same pattern of findings holds when taking no qualifications as the reference.

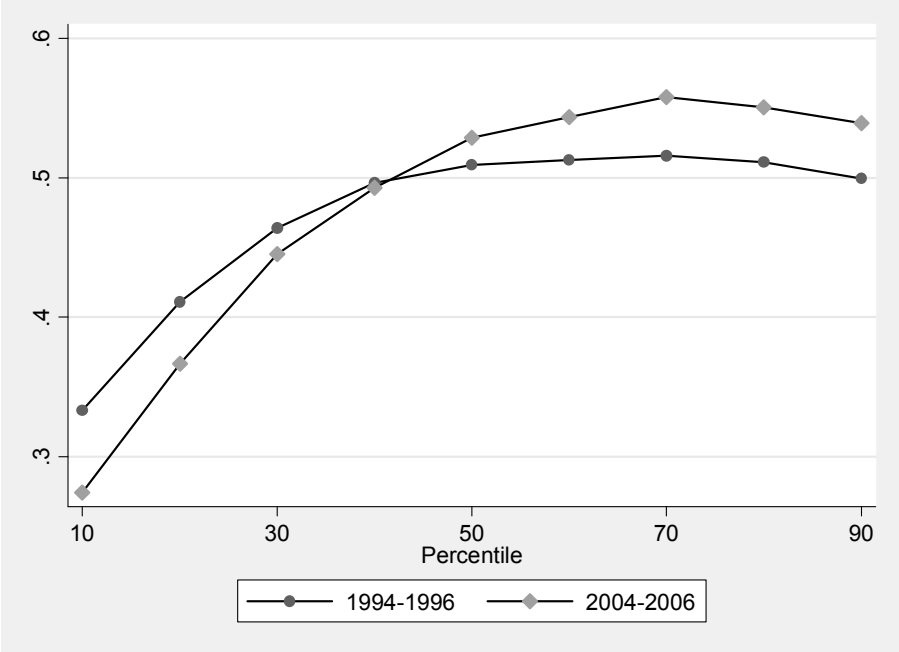
education must have a larger effect on those with greater unobserved ability. It is notable, however, that the same pattern does not apply to men at the start of the period (Figure 3a).

Figure 3a Quantile Regression Estimates of Returns to Graduate Education for Men, 1994-6 and 2004-6.



See Appendix Table A1 for estimates and standard errors.

Figure 3b Quantile Regression Estimates of Returns to Graduate Education for Women, 1994-6 and 2004-6



See Appendix Table A1 for estimates and standard errors.

Figure 4a Quantile Regression and OLS Estimates of Returns to Graduate Education for Men

3-year moving window.

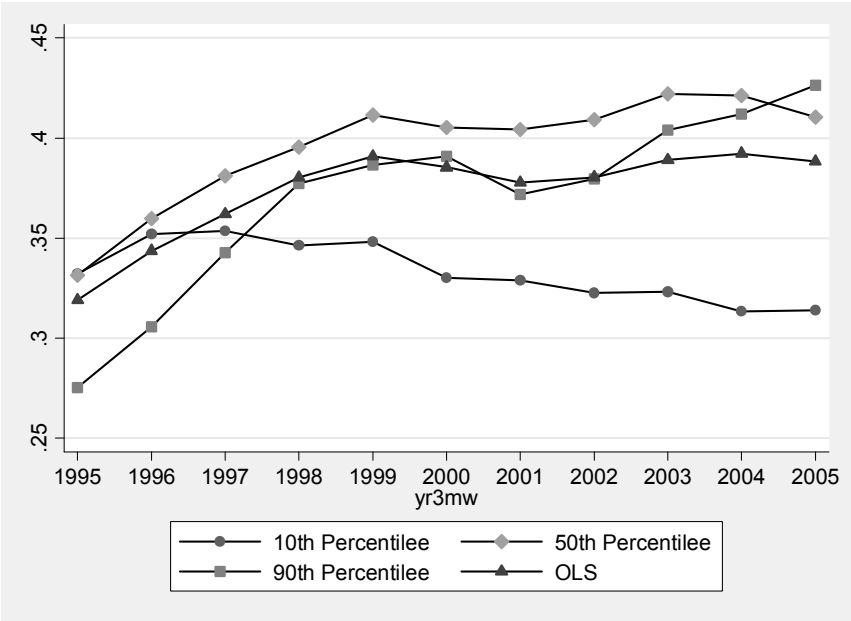
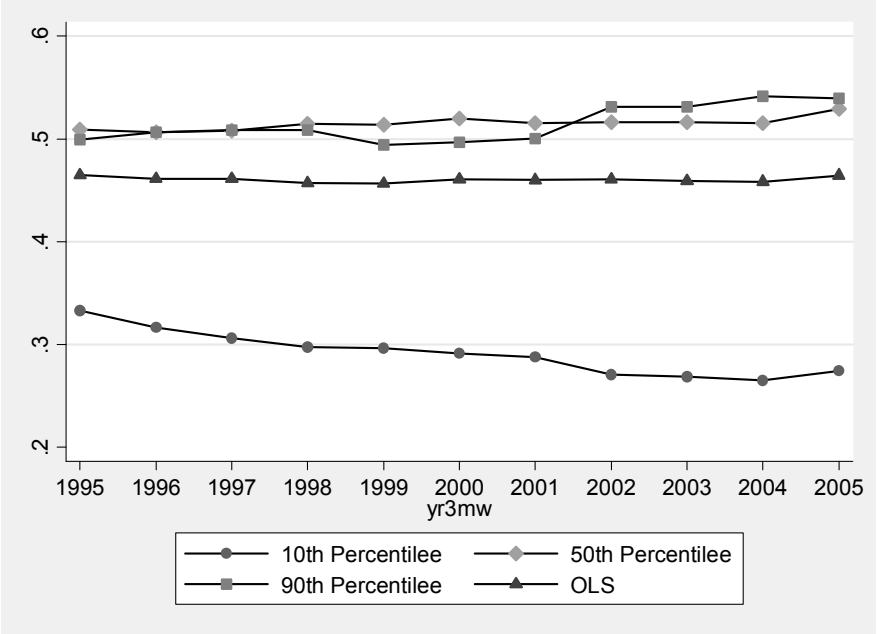


Figure 4b Quantile Regression and OLS Estimates of Returns to Graduate Education for Women

3-year moving window.



A novel aspect of Figures 3a and 3b is that for both men and women the dispersion in the returns to graduate education increased over the period. For men, the returns at the 30th and higher quantiles increased significantly between 1994-6 and 2004-6, while at the 10th quantile the point estimate of the returns decreased by a small amount. Over the period the gap between the returns at the 90th and 10th quantiles rose from -0.06 to 0.11 log points. For women, the gap rose from 0.17 to 0.27 log points. Though other changing factors will have contributed, Figures 3a and 3b present a crude "before and after" picture of the effects of the participation surge on the dispersion of returns to graduate education.

Figures 4a and 4b present some dynamic details for the same story: they reveal that the declining returns at the 10th quartile set in for men at around the end of the 1990s, while for women there was a steady slow decline throughout the period. In contrast, the returns at the median and the OLS returns rose for men until the end of the 1990s, and remained relatively steady for women throughout the period. The stable OLS returns appear to support the proposition that on average the demand for graduates relative to GCSE-level school leavers kept pace with the relative supply, and is typically used to support the proposition that the extra supplies of graduates are being adequately utilised. However, the broader picture given in these Figures indicates that the experiences of graduates in the labour market are quite heterogeneous, and becoming more so.

How could this increasing dispersion be rationalised? It might be argued that during the surge in participation the changing composition of successive student cohorts will have raised the variance of unobserved ability within the graduate labour force. At the same time, however, there will have been a changing variance arising from the changing composition of Level 2 achievers. If the unobserved ability variance of the Level 4+ achievers were to have increased relative to that of the Level 2 achievers, then, following the argument that graduate education is complementary with unobserved ability, the interpretation would be that those graduates at the lower end of the unobserved ability distribution are less able than their counterparts in earlier cohorts, and hence gained fewer benefits from graduate education. Simultaneously, it might be argued, the demand for average or very able graduates continued to expand sufficiently

rapidly to maintain or to raise the returns to graduate education for them. In short, the pattern of changing returns might still be rationalised within the human capital picture of a race between demand and supply. [7]

We are reluctant, however, to rest our understanding of the increasing dispersion on such an interpretation, relying as it does on an ad hoc assumption about the distribution unobserved ability and a hard-to-verify inference about its interaction with graduate education. Moreover, as Atkinson (2007) has argued, the textbook supply and demand model may be especially inadequate for explaining the dispersion of earnings at the top end of the distribution. Moreover, much of the pay of older graduates is attributable to long periods of occupation-specific work experience, generating a segmentation among graduates. One would not expect, in response to a radical supply shift, to see quick changes in the pay attached to professional and other graduate jobs, and this implies that demand side variables will be important in the determination of pay. Demand side characteristics are seen as central to the determination of pay in the job-queuing model (Thurow, 1972) and in the more general framework of job assignment models (Sattinger, 1993), each of which have been found to be consistent to some extent with evidence about the effect of overqualification on pay. With this alternative interpretation, the returns to graduate education may become low for some employees because, as in assignment or queuing theories, the pay is largely determined by the jobs. However, the literature on returns to education has hitherto tended not to take into account evidence of demand-side effects on pay, treating any such effects as short-run perturbations or as orthogonal to the treatment effects of education.

In what follows, we offer an interpretation of the falling returns to graduate education at lower quantiles, following the higher education expansion, in terms of overqualification: we propose that the returns at the lower end have fallen because more people at this end are failing to obtain graduate-level jobs (with associated pay). Moreover, since those who become overeducated are not in effective competition with graduates who are matched with graduate jobs, the falling returns at the lower end can co-exist with stable or rising returns to matched graduates.

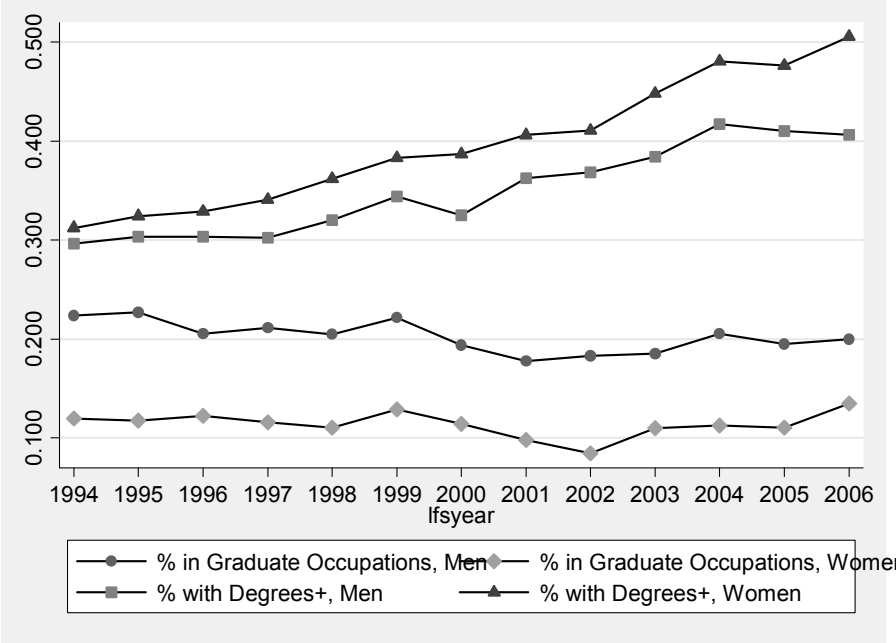
[7] In addition, since teaching resources per student declined with the surge in participation, the lower resources might have interacted with the more variable student abilities.

We define overqualification for graduates as the state of being in a job for which the required qualification to get the job is below level 4 [8]. Why might overqualification be a useful way of understanding dispersion in the returns to the graduate education? Even though the QLFS does not contain information on the qualification requirements of jobs, the occupational destinations of graduates at the start and end of our period of study are revealing (Figure 5). A crude definition of "graduate jobs", for this purpose, encompasses those in SOCs 1 to 3. Looking at those in the lowest quintile of the residual pay distribution (encompassing the 10th quantile where Figures 4a and 4b show declining returns), it can be seen that the proportions in that quintile with degrees is higher than the proportion of employees in "graduate jobs". Moreover – and this is the significant point – the gap increases over the period: the proportion with degrees increases while the proportion in graduate jobs decreases a little (men) or is unchanged (women). We have repeated the exercise using two alternative typologies of graduate occupation (Elias and Purcell, 2004; Chevalier, 2003), and found a similar pattern of growing disparity in the lowest quintile between the proportion of graduates and of graduate jobs.

These observations are consistent with the view that the rising dispersion in the returns to graduate education is linked to rising overqualification of graduates. The implied measurement of overqualification is, however, questionable. Investigation of our interpretation can be carried out more satisfactorily using direct measures of the qualification requirements of jobs, which can be used to classify whether workers are matched to their jobs. Before turning to our new data from the UK Skills Surveys, which permit the direct measurement and classification of overqualification, it will be useful first to review relevant findings from earlier empirical studies of overqualification.

[8] Explicitly this definition refers to 'getting' rather than 'doing' the job. If an individual had to have a degree to get the job, she is not regarded as overeducation even if in her judgement having the degree (and the associated skills) is not necessary for doing the job. For evidence on the latter see Felstead et al. (2007).

Figure 5 Changing Composition of the Lowest Quintile of the Residual Wage Distribution



3 Previous Evidence on the Classification, Trend and Impact of Overqualification

Although there lacks a consensus within economics on the usefulness of the concept of overqualification, the literature is held together by certain regular empirical relationships which are robust to different measurement strategies. Overqualification is normally found to be associated with a notable pay penalty relative to those who are matched to a job at their own level: McGuiness (2006) and Sloane (2003) provide good overviews. The penalty is typically found to be in the range 10% to 25%, depending on data and the definition used. In several, though not all, studies overeducated workers are also found to have moderately higher pay than their less-educated, matched, co-workers. Overqualification is also associated with substantially lower job satisfaction and well-being at work (Allen and Van der Velden, 2001; Green and McIntosh, 2007; Maynard et al., 2006; Vaisey, 2006; Pollmann-Schult and Buchel, 2004); and there is evidence from the Netherlands that overqualification contributes to cognitive decline among workers (De Grip et al., in press). There is limited evidence about whether overqualification is a permanent state for individual workers, but such as there is suggests that, for some, the

condition is persistent (Dolton and Vignoles, 2000; Rubb, 2003; Frenette, 2004). We also have little evidence as to how long-lasting are the costs. Nevertheless, the weight of empirical research is sufficient to show that being overeducated is associated with a significant deterioration of worker well-being. All investigated countries have substantial rates of both overqualification and undereducation (where job incumbents are less qualified than the requirements for new job entrants). Assignment theory (Sattinger, 1993), which recognises that there can be more or less close matches between workers and firms and is explicitly a theory of disequilibrium, provides a plausible and empirically supportable framework for understanding qualifications mismatch (McGuinness, 2006). The topic remains an active area of research.

Not all studies conceive of overqualification in the same way. An interpretation common in psychology studies encompasses the idea of skill underutilisation, whereas economic studies tend to distinguish between skill underutilisation and overqualification. As an example of the former, Johnson et al. (2002) conceptualise and measure underused talents and work experience and being too highly qualified as aspects of the same latent phenomenon. Some recent economics studies, by contrast, have made explicit distinction between overqualification and skill underutilisation. Green and McIntosh (2007), for example, show that there is a positive but far from perfect correlation between the two conditions, which they regard as separate, since qualifications and skills are conceptually and practically distinct. Green and McIntosh (2007) and Allen and Van der Velden (2001) find that there are significant detrimental effects of skill underutilisation on pay and job satisfaction, even after conditioning on overqualification. Chevalier (2003) follows a similar path by dividing overqualification into two categories: “apparent overeducation” is where a graduate is in a non-graduate occupation, but satisfied with the match between qualification and job; while “genuine overeducation” is where the graduate in a non-graduate occupation is dissatisfied with the match. In other words, Chevalier takes satisfaction with the qualification-job match as providing real information about the match. The two types have different associations with pay and other outcome variables. For example, “genuine overeducation” is found to bring a much larger pay penalty than “apparent overeducation”. We agree with Chevalier (2003) that it is useful to distinguish between types of overqualification, according to whether the overqualification is associated with a perceived underutilisation of skill. However, we think that it is preferable, where the data allow it, to base the decomposition on explicit

instruments identifying skill underutilisation, rather than indirectly via a satisfaction measure. We propose a new simple decomposition in the next section.

Whichever way overqualification is measured, an important issue for helping to understand the evolving balance between supply and demand for highly-educated workers is whether the level of overqualification is growing or falling. Unfortunately, there is hitherto very little evidence on this issue, because most research has consisted of one-off studies of individual cross-sections, using varying measurement strategies. While Hartog (2000) finds evidence of some growth in overqualification in the Netherlands over 1960-1995, Spain 1985-1990 and Portugal 1982-1992, a meta-analysis of 25 single country studies (Groot and van den Brink, 2000) found that there has in recent decades been no upward trend in overqualification. However, the latter's analysis extended only until the 1990s, was not able to allow for heterogeneous trends among countries, and was not decomposed according to type of overqualification as suggested in Chevalier's study (2003). In a subsequent study, Chevalier and Lindley (2007) find that there was a doubling in the proportions of both the "apparently" overeducated and of the "genuinely" overeducated, between cohorts of workers graduating in 1990 and those graduating in 1995 in Britain. Longer-term evidence for Britain using consistent measurement methods show a continual increase in overqualification between 1986 and 2001, both for graduates and for all employed people (Felstead et al., 2002). Thus, although we do not know what the recent trend is for other countries, the issue of overqualification has been acquiring greater empirical significance in Britain.

Notwithstanding the aforementioned empirical regularities, overqualification studies have had only a muted influence within the conventional economics of education. Yet, at a time of rapid change it might be expected that disequilibrium should form an important part of the explanation(s) offered for education's changing relationship to the economy. It seems far fetched to assume that a market-clearing rate for each qualification level is automatically achieved, especially given that young individuals are making life-time-oriented education decisions in the face of considerable uncertainty. As a disequilibrium concept, overqualification ought therefore to be considered a potentially useful tool in helping to understand the impact of large shifts in the flow of highly educated workers, such as that which began in Britain in 1989.

In light of this evidence and of the previous discussion, we therefore address the following issues:

i. What is the continuing trend in the prevalence of overqualified employees in Britain, up to the middle of the current decade, following the expansion in the 1990s of the flow of new graduates onto the labour market? Do different types of overqualification change in different ways from others?
ii. Relatedly, does the experience of overqualification for each cohort of graduates diminish as each cohort grows older, and are successive cohorts becoming more or less overqualified?
iii. How have the costs of overqualification – in terms of lost pay or greater job dissatisfaction – changed in the recent decade, following the expansion of higher education?
iv. Are the changing extent and effects of overqualification linked to the increasing dispersion in the returns to graduate education identified in Section 2?

4 Data Sources and the Measurement of Types of Qualification Mismatch.

The key requirement for addressing these questions is data suitable for measuring overqualification in a consistent way over time and covering recent years after the accelerated influx of graduates onto the British labour market, as well as a means of disaggregating overqualification according to whether it is accompanied by skills underutilisation, and adequate measures of outcomes (hourly pay, job satisfaction). We use data drawn from the 2006 Skills Survey, along with three earlier surveys. To facilitate trend analyses, the 2006 Skills Survey was designed to ensure comparability with the earlier surveys, and to this end used identical instruments for the measurement of the qualification requirements of jobs, and other relevant variables. The 2006 survey covered employed people aged 20 to 65 across the UK, with an achieved sample of 7,787 individuals. So as to compare with earlier surveys, we restrict the sample to those aged no more than 60, living in England, Wales or Scotland (south of the Caledonian Canal). We also limit the sample to employees aged 25 and over, assuming that by 25 the very large majority of people will have finished full-time education. Weights were computed to take into account the differential probabilities of sample selection

according to the number of dwelling units at each issued address, the number of eligible interview respondents (Kish weight), and the oversampling of certain regions. The distribution of the achieved sample was compared with the Quarterly Labour Force Survey, according to sex, age, ethnicity, working time, occupation, industry and qualification level, and found to be acceptably close. However, sex and age weights were added to the sample weights in order to correct for a slight under-representation in the achieved sample of men and those in their twenties. With this correction, the result is a high quality, randomly drawn, data set, with an achieved representative sample for Britain of 5,224 employees. Details are provided in Felstead et al. (2007).

The earlier data sources, each containing nationally representative samples drawn with similar random probability methods, were Employment in Britain in 1992, the 1997 Skills Survey and the 2001 Skills Survey: for details see, respectively: Gallie et al. (1998), Ashton et al. (1999) and Felstead et al. (2002). In addition to meeting our requirements for analysis of change over time, the surveys furnish measures of the skills used in jobs, which can serve to test the validity of the overqualification typology adopted.

Measurement of job qualification requirements has been undertaken in a variety of ways in earlier studies, usually driven by data availability. However, the two preferred methods use either expert assessment or the job-holder's assessment. We use the latter method. Respondents were asked: "If they were applying today, what qualifications, if any, would someone need to get the type of job you have now?". From the range of options given, we derived the highest qualification required, classified into four academic/NVQ-equivalent levels.

In line with convention we define an individual to be overqualified (underqualified) if her own qualifications (Q) exceed (are less than) her job's required qualifications (RQ):

Overqualification dummy: $OQ = 1$ if $RQ_i < Q_i$, $OQ = 0$ if $RQ_i >= Q_i$ (1)

Underqualification dummy: $UQ = 1$ if $RQ_i > Q_i$, $UQ = 0$ if $RQ_i <= Q_i$ (2)

where index i takes on values 0 to 4.

Skill utilisation is measured in our data through individuals' subjective reports of their job. In one question, individuals were asked: "How much of your past experience, skill and abilities can you make use of in your present job?", with answers against a scale:

"very little"/ "a little"/ "quite a lot"/ "almost all". This question was asked in identical fashion in 1992, 1997 and 2006. Those who answered in either of the first two scale points were taken to be underutilising their skills. We thereby generated a 0/1 dummy variable for overskilled (OS). Taken over the pooled data, the correlation coefficient between OS and OQ is 0.163 (p=0.000), which confirms that as expected the association between overskilling and overqualification is significant but loose.

In line with the earlier discussion, we decompose the overqualification state into two categories, according to whether the overqualification is associated with underutilisation of skills. In one category, which we shall term "Real Overqualification", the individual is both overqualified and experiencing skill utilisation; while in the other, which we term "Formal Overqualification", the individual is overqualified as defined in (1) but experiences full skill utilisation.[9] Real Overqualification occurs if and only if OQ = 1 and OS = 1, while Formal Overqualification occurs if and only if OQ = 1 and OS = 0. This leaves an additional category of those for whom OQ = 0 yet OS = 1, which we term "Skills Underutilised", and the remaining category comprises those who are in none of the other three, termed simply "Matched".

When experiences are reported with single items there is always a risk of some error or bias, so it is preferable where possible to utilise multiple items for measurement. In a second question aimed at the same concept, respondents were asked how much they agreed with the statement: "In my current job I have enough opportunity to use the knowledge and skills that I have". They were given a 4-point agreement scale. Those who answered "disagree" or "strongly disagree" with this statement were taken to be underutilising their skill. The responses were related as expected with those on the "how much" scale in the first question (the correlation coefficient is 0.30, p = 0.00). Unfortunately, the second question was asked only in 2001 and 2006, so to cover the period it is not possible to combine the indices. Instead, we present some data using this second question as a robustness check on the trends revealed by the first question. Before proceeding to discuss findings about the trends in overqualification and in its component parts, we present first some descriptive statistics, in order to test the validity of the classification of overqualification adopted. Taking graduates as a group, we

[9] We utilise the "formal/real" duality in contrast to Chevalier's "apparent/genuine" duality, in part to flag up our distinct typology but also because the term "apparent" seems almost to suggest the absence of an effect *a priori*, an impression which we think it preferable to avoid here.

hypothesised that those classified as matched to graduate-level jobs would be in higher skilled jobs than those in any of the overqualification categories. Moreover, we expected that those in the Real Overqualification category would be in the least skilled jobs. To see whether this is indeed the case we pool the data from 1992, 2001 and 2006, and examine various job-skill measures for each category -- see Table 1.

As expected, graduates in the Real Overqualification category are working in jobs with low skill demands according to all of several measures. The first two columns show the estimated time taken to "learn to do the job well", where the presumption in the measure is that jobs which can be picked up in less than a month from the time when first started are unskilled. As can be seen, 38.0% of jobs in the Real Overqualification group are low-skilled by this measure, compared with just 6.7% in matched jobs. The third column gives the proportion of jobs where incumbents are required continually to learn new things – only 19.4% in the Real Overqualification group, compared to 50.0% of those in matched jobs. Columns 4 and 5 present direct measures of job skill use, utilising the measures reported in Felstead et al. (2007). Column 4 is the proportion of jobs requiring the use of "influence skills" – involving persuading and influencing people, teaching and instructing them, and other forms of high-level communication. Column 5 is the proportion of jobs requiring computer use at high levels of sophistication. Both these skills are highly rewarded in the labour market (Dickerson and Green, 2004), and in both cases the Real Overqualification group are in jobs that are less skill-demanding than those of all other groups. Finally, Column 6 gives the proportion of graduates in "graduate jobs" as defined for Figures 5a and 5b: only 33.5% are in the top three occupational groups, compared with 89.5% of the matched group.

The next lowest skills are for those in the Formal Overqualification group: those formally requiring less than graduate-level qualifications but not perceiving themselves to be under-utilising their skills. These are followed by the group that are Qualification Matched but Skills Underutilised. The highest skilled jobs, according to all these summary measures, are found for those in the Matched group. With only a few minor exceptions, moreover, the same ranking of job-skills is found for the classification deployed using the second definition of skill underutilisation (though this time with just the 2001 and 2006 data).

A further point of internal validation may be obtained by examining whether graduate respondents feel that they have achieved in work what they expected. We hypothesised that those matched to jobs would be more likely to have felt that they achieved their expectations, than those who were overqualified. Respondents were directly asked how well they thought they had done in their working lives, compared to their expectations. They could respond against a five point scale. Among those graduates in the Real Overqualification group (first definition), 42.4% answered at the bottom two points of the scale, namely that they had done "a bit less well" or "much less well" than expected; this compares with 17.3% of those who were matched to their jobs and utilising their skills.

Table 1 Validation of Decomposition of Overqualification and Matched Status of Graduates by Whether Skills are Underutilised

a) First Definition

(% of graduate employe	Learning Time Over 2 Years	Learning Time Under 1 Month	Require-ment to Learn New Things	Influence Skills Require-ment	Complex/ Advanced Computing Skills Require-ment	In SOC Major Groups 1-3
Real Overqualification	8.0	38.0	19.5	5.0	11.3	30.9
Formal Overqualification	26.3	13.1	36.7	25.7	25.0	58.0
Qualification Matched and Skills Underutilised	30.5	7.1	43.9	26.2	34.2	79.4
Qualification Matched and Skill Utilised	43.9	6.7	49.9	50.1	30.8	89.7

b) Second Definition

(% of graduate employees)	Learning Time Over 2 Years	Learning Time Under 1 Month	Require-ment to Learn New Things	Influence Skills Require-ment	Complex/ Advanced Computing Skills Require-ment	In SOC Major Groups 1-3
Real Overqualification	11.5	43.0	16.6	10.7	18.3	29.0
Formal Overqualification	25.2	11.4	37.5	23.9	27.6	58.7
Qualification Matched and Skills Underutilised	34.2	11.7	37.9	38.9	32.3	89.9
QualificationMatched and Skill Utilised	44.4	5.6	52.6	49.4	40.2	89.1

Table 2. Prevalence of Graduate Overqualification by Gender, Presence of Dependent Children, Age, and Education Characteristics

Row percentages for each group, summing to 100%.

	Real Overqualification	Formal Overqualification	Qualification-Matched and Skills Underutilised	Qualification-Matched and Skills Utilised
Men	8.6	20.6	5.7	65.1
Women	7.5	20.3	4.9	67.3
Women Part-timers	10.8	24.7	4.6	59.9
Dependent Children Under 16				
Yes	8.5	20.3	4.1	67.0
No	8.1	22.9	5.9	63.2
Maths Level **				
Below A-Level	9.4	24.9	4.7	61.1
A-Level or above	5.3	13.7	6.4	74.6
University Type				
Oxbridge	0.0	10.6	0.4	89.0
Pre-1992 University	8.9	14.3	6.0	70.9
Other UK	8.8	21.4	4.7	65.2
Non-UK	14.8	21.4	3.7	60.1
*Degree Grade**				
Below Upper Second	12.8	20.0	3.5	63.7
Upper Second or First	9.3	15.6	4.6	70.4
*Degree Subject***				
Maths and Sciences	6.7	12.8	6.1	74.4
English and Humanities	12.0	18.4	2.1	67.5
Business, Management, Economics	8.4	17.8	5.8	68.1
Vocational: including law, medicine, nursing, education	3.3	6.7	6.6	83.4
Social Sciences	7.9	21.2	5.7	65.2
Art and Design	24.5	33.6	3.2	38.7

*2006 data only; ** pooled 2001 and 2006 data; otherwise, pooled 1992, 2001 and 2006 data.

The university and subject data are only available for degree graduates.

If the classification of overqualification is plausible, who are the people that fall in these categories? Table 2 also pools data, and presents statistics describing how graduate overqualification groups are distributed by gender and by educational achievement. Overqualification is particularly high among female part-time employees, echoing recent research on trends in part-time work (Connolly and Gregory, 2008). As previous studies have found, overqualification is also found to be less prevalent for graduates with higher personal skills indicators. Thus, Real and Formal Overqualification are each less prevalent when respondents had gained maths at A level or above, or had achieved an upper second or better class of degree, or had graduated from Oxford or Cambridge. Formal overqualification is also less prevalent for those graduating from pre-1992 universities than for those graduating from other universities. Overqualification is also especially high, as other studies have found, for graduates of Art and Design, and especially low for those graduating in professional vocational subjects.

Taken together, these tables imply that the categorisation of overqualification which we suggest, based on either of the additional questions addressing underutilisation of skills, is plausible, given the other available summary information about the nature of the job, as shown in Table 1, or about the person's educational achievements as shown in Table 2. We therefore proceed in the next Section to examine the trends in the prevalence and effects of overqualification.

Other variables are standard, and are delineated in the analysis that follows. A key outcome is pay, and to avoid outlier-induced biases we excluded the top and bottom 0.5% of the pay distributions from the sample, separately for men and women.

5 Findings

The growth of overqualification

As noted above, there is hitherto limited evidence available as to the trend in overqualification in Britain following the expansion of higher education. Table 3 presents findings about the changing prevalence of graduate overqualification in Britain between

1992 and 2006. In the case of men, overqualification increased steadily over the period, rising overall from 21.7% in 1992 to 33.2% in 2006. For women, overqualification rose overall by a similar amount, from 23.8% to 32.1%; the increase came through a leap in the current decade, following stability in the 1990s. These are substantial rises, which coincided with the steep increase in the proportion of graduates in the labour market.

In the third row of each panel of Table 3 is recorded the proportion of graduates experience underutilisation of skills. According to the first definition, there is not much change in underutilisation over the whole 1992 to 2006 period, either for men or for women; according to the second definition, there is no significant change for men, and only a small rise for women between 2001 and 2006. Taken together, it appears that, even though overqualification and overskilling are correlated, their trends are different. The rising extent of overqualification has not been accompanied by a rising sense of skill underutilisation.

This finding leads to the hypothesis that, even though more graduates are finding themselves in jobs where their qualifications are not formally required, these same graduates nonetheless are able to make use of their skills. To examine the trend further, we utilise the decomposition of overqualification delineated in the previous section. Table 3 confirms that it is Formal Overqualification that has increased sharply for both men and women, especially over 2001-6 in the case of women. This category now represents just under a quarter of graduates. Real Overqualification is a less numerous category, with fewer than a tenth of graduates falling into it. There has been an increase in the point estimate of its prevalence, according to either definition, for both genders; however, the increase is quite small and not statistically significant.

Overeducated graduates, in taking up jobs at lower skill levels, may restrict the availability of jobs for those educated at lower levels, especially if employers preferentially employ graduates in lower-level jobs. “Bumping down” thus would lead to an increase in overqualification for lower educational groups, which can add to other tendencies towards mismatch for lower-level jobs. Table 4 records the overall experience of overqualification across all employees, and reveals a broadly similar pattern of change to that observed for graduates. Overqualification is rising for both men and women, and has now reached 37% of employees. Overskilling, by contrast, is not

rising for men; and for women even fell in the 1990-2001 period. Decomposing overqualification into formal and real overqualification, for both genders there is a big rise in formal overqualification, but no obvious trend in real overqualification. For all employees, underqualification fell by a modest amount for men, while remaining stable for women: by 2006 it stood at 14.6% of the male employees, 13.1 % of female employees.

Table 3 Education/Job Matching for Graduates, 1986-2006 (% of graduate employees)

a) Men

	1992	1997	2001	2006
Matched	78.3	77	73	66.8
Overqualified	21.7	23	27	33.2
Overskilled 1	15.4	-	12.8	15.4
Overskilled 2	-	-	16.5	16.6
Decompositions of Overqualified				
Real Overqualification 1	7.5	-	7.2	9.9
Formal Overqualification 1	14	-	19.8	23.4
Real Overqualification 2	-	-	7.3	9.7
Formal Overqualification 2	-	-	19.7	23.5

b) Women

	1992	1997	2001	2006
Matched	76.2	74.8	76.6	68
Overqualified	23.8	25.2	23.4	32.1
Overskilled 1	12.2	-	12.0	12.7
Overskilled 2	-	-	15.4	17.6
Decompositions of Overqualified				
Real Overqualification 1	7.2	-	5.9	8.4
Formal Overqualification 1	16.1	-	17.5	23.7
Real Overqualification 2	-	-	7.5	10.0
Formal Overqualification 2	-	-	15.9	22.1

Table 4 Education/Job Matching for All Employees, 1986-2006 (% of employees)

a) Men

	1992	1997	2001	2006
Matched	55.1	53.7	50.7	48.1
Overqualified	26.4	26.5	32.5	37.3
Underqualified	18.7	19.8	16.8	14.6
Overskilled 1	25.7		21.7	24.1
Overskilled 2			16.7	16.1
Decompositions of Overqualified				
Real Overqualification 1	9.8		11.3	12.4
Formal Overqualification 1	16.6		21.2	25.0
Real Overqualification 2			8.0	9.1
Formal Overqualification 2			24.5	28.2

b) Women

	1992	1997	2001	2006
Matched	60.0	54.3	52.8	49.2
Overqualified	28.4	31.1	34.0	37.7
Underqualified	11.6	14.6	13.2	13.1
Overskilled 1	30.5		23.7	22.9
Overskilled 2			18.9	16.5
Decompositions of Overqualified				
Real Overqualification 1	12.8		10.9	11.7
Formal Overqualification 1	15.5		23.1	26.0
Real Overqualification 2			9.4	9.6
Formal Overqualification 2			24.5	28.1

Overqualification of successive age cohorts

We complete this description of the changing extent of overqualification by examining overqualification in successive cohorts. As can be seen in Table 5, for both men and women the 25-38 year old cohort in 2006 was more overqualified than its earlier counterpart in 1992 (for men, 34.4% compared with 24.3%; for women, 35.2% compared with 19.7%); similarly, for men the 2006 39-52 cohort was more overqualified than its 1992 counterpart.

Overqualification can change within each cohort as it ages for a number of reasons, which could only be explored fully with longitudinal data. Overqualification would fall if overqualified workers switch within or between employers to higher skill jobs, or alter the content of jobs within existing job-titles. There could also be a selection effect with overeducated workers quitting more readily than matched workers. If, on the other hand, overeducated workers were less ready to quit, or if cohorts gain qualifications through lifelong learning faster than they are able to find upgraded jobs, the prevalence of overqualification can rise within any cohort as it gets older. In the event, the male cohort that was aged 25-38 in 1992 retained approximately the same prevalence of overqualification late in life in 2006, while the same-aged female cohort became more overeducated. In contrast, the male cohort that was 39-52 in 1992 became much more overqualified, while the female cohort experienced little change. We conclude that, whatever the cause, overqualification has persisted within cohorts as they grow older.

Table 5 Overqualification Within Graduate Cohorts

Cohort	Cohort age in:	Men		Women	
	1992 | 2006	1992	2006	1992	2006
1	11-24 | 25-38	na	34.4	na	35.2
2	25-38 | 39-52	24.3	25.6	19.7	27.9
3	39-52 | 53-66*	16.9	46.7	27.3	28.4

The costs of overqualification for graduates

We now estimate the costs of overqualification in two dimensions, pay and job satisfaction. As noted above, earlier studies have established that lower pay and less job satisfaction is associated with overqualification, while overqualified workers are also found commonly to be better paid than their matched co-workers at the same education level. The two issues for examination here are whether the costs of overqualification have been changing, and whether the costs of the two types of overqualification differ.

Table 6 presents estimates of the penalty associated with overqualification for graduates, separately for men and women, expressed as reductions in the log of hourly pay, extracted from conventional earnings functions in successive years. For brevity,

the Table shows only the coefficients of interest, since the other control variables are standard and follow the usual pattern. We have not corrected for possible endogeneity bias on the overqualification dummy coefficient; the estimates show the conditional association of overqualification with a pay penalty, rather than a treatment effect.

In the first panel the penalty for being overqualified in any way is shown. For men, the estimated penalty was already substantial, at 0.28 log points (32%) in 1992. The penalty remained at similar levels in 1997 and 2001, but rose significantly and substantially to 0.40 log points in 2006. For women, the penalty rose substantially between 1997 and 2001, and yet more to 2006 when it reached 0.45 log points. In short, for both men and women, there has opened up a sharp increase in the penalty for being overqualified in the first part of the current decade. This finding differs from that of Chevalier and Lindley (2007), but their analysis extends only until 2002, since when the graduate labour supply has increased substantially. In our results, the increase in the pay penalty was not yet evident in 2001 for men.

Given the differential rates at which the different categories of overqualified workers have expanded in numbers, as shown above, it is also of interest to examine whether there are different penalties for the two categories. These results are shown in the bottom panels of each part of Table 6.

For both men and women, the penalty associated with overqualification is substantially greater for those in the Real Overqualification category than for those in the Formal Overqualification category. This finding is consistent with that of Chevalier (2003), albeit on the basis of our different method of decomposition. For men, the point estimate of the penalty associated with Real Overqualification increased between 1992 and 2001, though because the numbers are small the precision is reduced and the rise was not statistically significant. Between 2001 and 2006, however, the penalty rose significantly from 0.49 to 0.62 log points. The penalty for Formal Overqualification also rose, reaching 0.32 log points in 2006, but here the rise is clearly just in the current decade. For women, the penalty associated with Real Overqualification was largely unchanged between 1992 and 2001 but jumped to 0.64 log points in 2006; while the penalty for Formal Overqualification rose during the 1992-2001 period, and hardly at all in the 2001-2006 interval.

In short, both categories of overqualification show evidence of being associated with a sharply increasing pay penalty in the most recent years – arguably the time when one might expect the pressure of increasing graduate labour supply to have an effect on graduates in the more flexible jobs. At the same time, it is much worse to be in a job with both too high educational qualifications and underutilisation of skills and abilities, than just to be overqualified and not overskilled.

Table 6 Estimated Conditional Association of Overqualification with Log Hourly Pay

a) Men

	(1)	(2)	(3)	(4)
	1992	1997	2001	2006
1. Estimates including graduate overqualification (see below for other variables included)				
Overqualified	-0.276 (0.050)	-0.330 (0.061)	-0.246 (0.050)	-0.404 (0.048)
Observations	1172	888	1657	2126
R-squared	0.43	0.43	0.40	0.45
2. Estimates including types of mismatch (see below for other variables included)				
Real overqualification	-0.401 (0.085)	- -	-0.488 (0.081)	-0.619 (0.099)
Formal overqualification	-0.240 (0.055)	- -	-0.175 (0.055)	-0.322 (0.042)
Qualification Matched but Skills Underutilised	-0.229 (0.069)	- -	-0.189 (0.092)	-0.046 (0.056)
Observations	1163	-	1657	2125
R-squared	0.44	-	0.41	0.46

b) Women

	(1)	(2)	(3)	(4)
	1992	1997	2001	2006
1. Estimates including graduate overqualification (see below for other variables included)				
Overqualified	-0.316 (0.048)	-0.257 (0.063)	-0.392 (0.040)	-0.454 (0.033)
Observations	1144	886	1643	2308
R-squared	0.49	0.58	0.57	0.55
2. Estimates including types of mismatch (see below for other variables included)				
Real overqualification	-0.441 (0.048)	- -	-0.430 (0.060)	-0.642 (0.056)
Formal overqualification	-0.250 (0.062)	- -	-0.386 (0.047)	-0.407 (0.033)
Qualification Matched but Skills Underutilised	0.109 (0.058)	- -	-0.076 (0.088)	-0.196 (0.058)
Observations	1134		1640	2306
R-squared	0.49		0.57	0.56

All estimates derive from a conventional earnings function, augmented by dummy variables for overqualification. The dependent variable is log hourly pay, and regressors also include lower educational levels and matches to jobs, a quadratic in work experience, and industry and regional dummies; the omitted category is “graduate qualification matched to a job requiring a graduate qualification”; robust standard errors are in parentheses.

Table 7 The Conditional Association between Overqualification Status and Job Satisfaction for Graduates

	1992	2006
A. Conditional Effect of Overqualification Status on Job Satisfaction (Compound Measure) *Reference category: matched graduates.*		
Real Overqualification		
Men	-0.278 (0.141)**	-0.612 (0.111)***
Women	-0.565 (0.204)***	-0.450 (0.149)***
Formal Overqualification		
Men	-0.282 (0.142)***	-0.126 (0.078)
Women	-0.046 (0.129)	-0.168 (0.074)**
Matched and Underutilised		
Men	-0.129 (0.143)	-0.216 (0.176)
Women	-0.423 (0.257)*	-0.247 (0.119)**

*, ** or *** indicate that the coefficient estimates differ significantly from the reference category (matched graduates) at the 1, 5 or 10% level

B. Predicted Overall Job Dissatisfaction of Graduates (% of workers)	1992	2001	2006
Men			
Real Overqualification	11.9 (9.8-14.1)	20.0 (18.2-21.9)	22.1 (20.0-24.2)
Fomal Overqualification	8.5 (7.2-9.8)	11.5 (10.9-12.1)	8.1 (7.6-8.5)
Matched	7.0 (6.6-7.4)	9.1 (8.8-9.4)	6.9 (6.6-7.1)
Difference (Matched minus Real)	4.9	10.9	15.2
Women			
Real Overqualification	22.1 (17.3-26.9)	26.8 (24.4-29.3)	23.1 (21.5-24.7)
Fomal Overqualification	4.3 (3.5-4.9)	6.3 (5.8-6.8)	8.9 (8.5-9.3)
Matched	4.9 (4.5-5.3)	8.7 (8.4-9.0)	6.8 (6.6-7.1)
Difference (Matched minus Real)	18.0	18.1	16.3

95% confidence intervals are shown in parentheses.

Note: The figures in both panels derive from estimations that are conditional on the education level and match variables, and also include controls for work experience (quadratic), public sector, establishment size, self-employment status, industry and region; the estimations are OLS regressions in the case of the compound measure of job satisfaction, and ordinal logits in the case of the overall job satisfaction measure. Full estimation results available on request.
The compound job satisfaction scale is computed as the average of the linearised scales of job satisfaction across 15 domains: covering promotion prospects, pay, relations with boss, job security, opportunity to use abilities, ability to use initiative, management ability, hours of work, fringe benefits, the work itself, the amount of work, work variety, training, friendliness of colleagues, communications between management and employees. The Cronbach's Alpha coefficient for this scale is 0.887 for the 1992 sample and 0.898 for the 2006 sample.
The figures in Panel B are the mean predicted probabilities that the worker is either "fairly dissatisfied", "very dissatisfied" or "completely dissatisfied", using the overall job satisfaction measure. Estimates are obtained using ordinal logit, with identical controls to those used in Panel A.

Our findings are shown in Table 7. We utilise two alternative measures of job satisfaction. First we derive a compound measure of job satisfaction, averaging responses on a 7-point scale to 14 items covering different domains, including both intrinsic aspects of the work and extrinsic aspects such as pay. We regress the compound measure against conventional variables used in job satisfaction equations, and include our measures of overqualification. The coefficient estimates for the different types of overqualification are shown in Panel A. Second, we utilise responses (same 7-point scale) on a single summary question about overall job satisfaction: "All in all, how satisfied are you with your job?". We estimate the determinants of overall job satisfaction using an ordinal logit specification, and use the estimates to predict the conditional proportions of dissatisfied workers.

Table 7 reveals that, for men, according to both measures (compound and overall), there is a substantial negative impact of Real Overqualification on job satisfaction; the impact increased significantly between 1992 and 2001, and in 2006, more than one in 5 graduates (22%) in this category are dissatisfied with their job, compared with about 1 in 14 (7%) of matched graduates. Formal Overqualification also brings some dissatisfaction according to the compound measure for 1992, compared with matched workers; but the difference becomes small and insignificant in 2006, and is also insignificant in its effect on the overall job satisfaction measure.

For women, Real Overqualification has been a substantial source of dissatisfaction according to both measures in all years examined, and its impact appears not to have changed significantly. Most striking, Formal Overqualification is not a significant source of dissatisfaction for women.

Taken together, the conclusion is that overqualification is not a problem for job satisfaction in itself if it is not accompanied by underutilisation of skill; but where it is accompanied by underutilisation of skills, overqualification is a substantive issue. For women, Real Overqualification, the category which generates dissatisfaction, is not expanding, and the dissatisfaction is no worse than before. For men the loss of job satisfaction is becoming more of a concern. Nevertheless this finding should be placed in perspective. Being in the Real Overqualification category is associated with an increase of 16 percentage points in the probability of being dissatisfied with one's job, but only 9.2% of male graduates are in this category -- this equates approximately to 150,000 dissatisfied graduates above a hypothetical alternative where all such graduates were matched to their jobs.

Overqualification and the dispersion in the returns to graduate education

We return now to the issue of the increasing dispersion in the returns to graduate education, our first finding reported above. Is that rising dispersion associated with the increasing incidence and cost of overqualification? This question can be assessed using the Skills Survey series with its consistent data on overqualification and wage outcomes over time, by estimating trends in the returns conditional on graduates being matched to graduate jobs. If the rising dispersion that appeared in recent years is associated with rising overqualification, as has been suggested, then as long as graduates are being matched with graduate jobs, one should expect to find that the difference between the estimated effects of graduate education at the top and bottom ends of the residual pay distribution remains constant (or as a weaker hypothesis changes by much less).

We investigate this question in a straightforward manner, which is displayed in Figures 6a and 6b. The "Average" returns are presented for each of the 10^{th}, 50^{th} and 90^{th} quantiles, as obtained from quantile regressions similar to those used with the QLFS data and portrayed in Figures 4a and 4b. Compared with Figures 4a and 4b the precision of estimates is lower (standard errors are reported in Appendix Table A2), owing to there being fewer observations. The Figures also show the "Matched" returns, which condition on being matched to a job requiring graduate-level qualifications.

As can be seen, the “Average” returns fan out in later years, giving the same pattern with the Skills Survey data as obtained in the QLFS data with returns at the 10th quantile falling. The 2006 difference between the 90th and 10th quantile is 0.263 log points for men, and 0.448 log points for women. For women the increased dispersion appears to have begun between 1997 and 2001, and intensified between 2001 and 2006, while for men the increased dispersion is evident only between 2001 and 2006.

In contrast, the “Matched” returns remain closer together over the period, and in particular are significantly closer together in 2006 than are the average returns. The difference between the 90th and 10th quantiles is just 0.053 log points for men, and 0.241 log points for women. For both sexes these estimates are significantly below those for the “Average” returns, and for men the estimate is insignificantly different from zero. For women, the dispersion of the “Matched” returns increased significantly less since 1992 than did the dispersion of the “Average” returns.

We conclude that the increasing dispersion between the returns to graduate education at different quantiles of the residual pay distribution is strongly, and in the case of men wholly, associated with the increasing prevalence of overqualification among graduates.

6 Conclusion

Several new findings have been reported about the returns to graduate education, using both the QLFS and a unique data series with consistent data on overqualification over a number of years, we have added substantially to what is known about overqualification and its effects. The surveys apply to representative samples of British employees aged 20 to 60. Over a fourteen-year period from 1992, there has been a substantial growth in the proportion of graduates who are overqualified for their jobs. Moreover, successive age cohorts entering employment have been experiencing greater overqualification. Among women graduates a large rise in the incidence of overqualification, from 23% to 32%, took place between 2001 and 2006.

Figure 6a

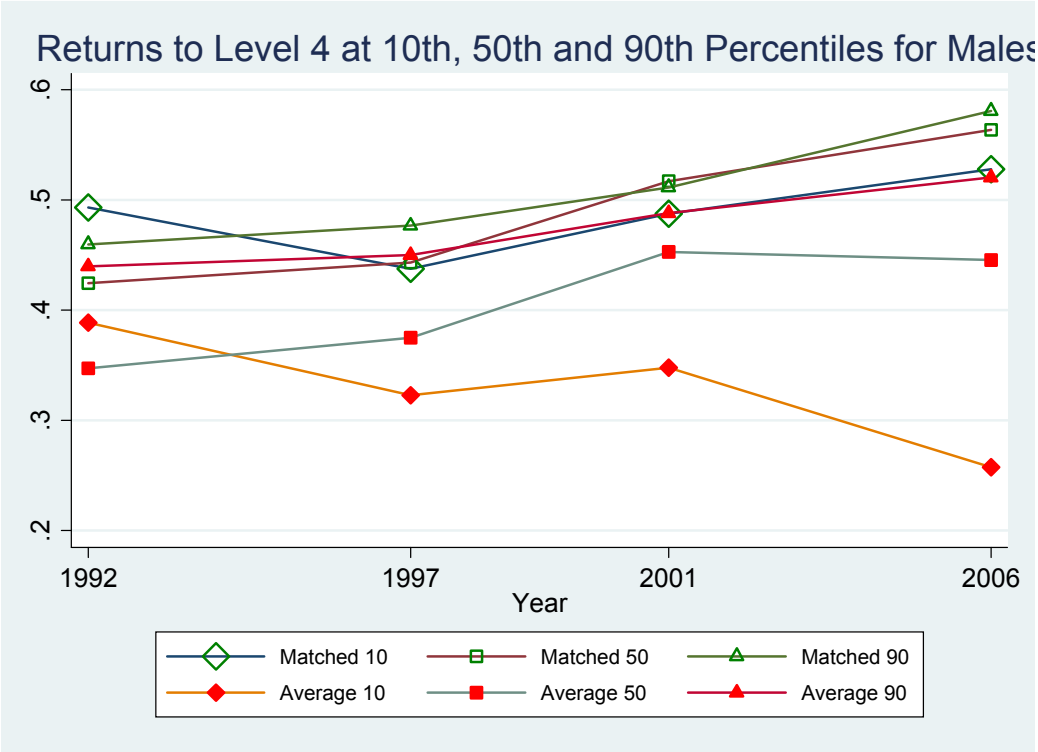
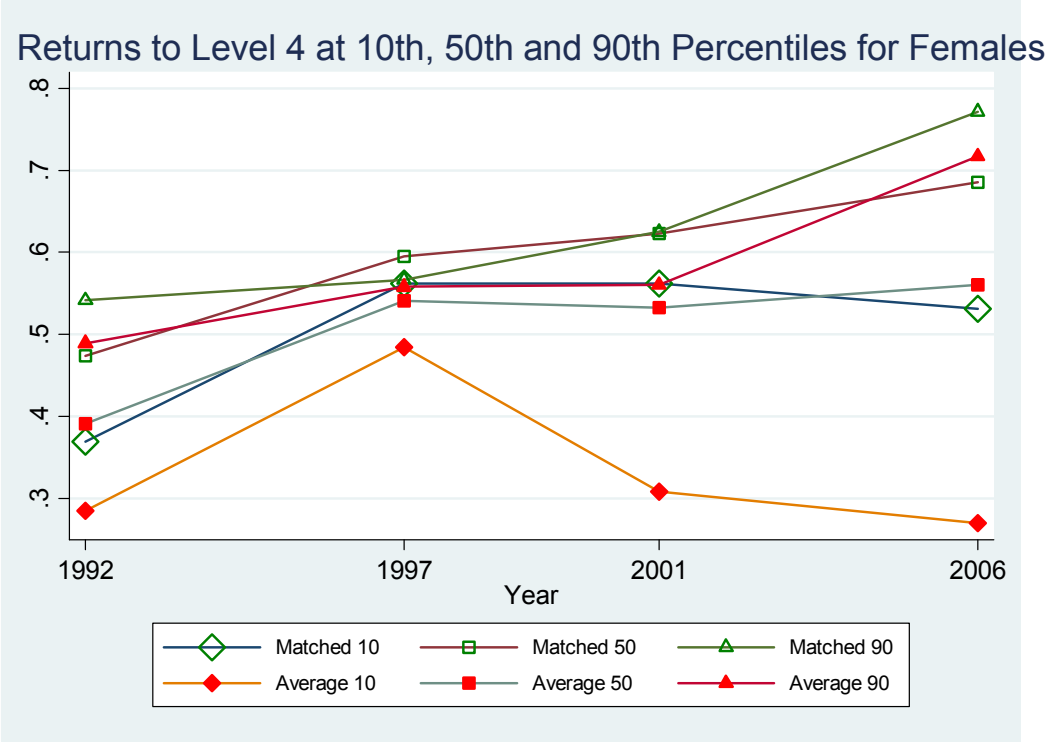


Figure 6b



The growth in overqualification has mainly been in the form of "Formal Overqualification", wherein employees reported that they are in below-graduate level jobs but nevertheless do not report that they are underutilising their skills. By 2006, this group comprised 23% of graduates. On average this group suffered an hourly pay penalty in 2006 of 0.32 log points (men) or 0.40 log points (women), but was not less satisfied with their jobs than matched graduates, even though the Formally Overqualified jobs were lower skilled than graduate jobs along a number of dimensions.

By contrast, there has been little or no growth in the proportions of those who report that they are both overqualified and underutilising their skills: this latter group ("Real Overqualification") still comprised less than one in ten graduates in 2006. The distinction between types is relevant because employees in the Real Overqualification group experienced greater, and more sharply rising, pay penalties than those in the Formal Overqualification group. By 2006 the estimated hourly pay penalty in the Real Overqualified Group amounted to 0.62 log points (men) or 0.64 log points (women); and the members of this group were much less satisfied with their jobs than matched gradautes. Taking the above trends together it can be concluded that, whether because of the increasing prevalence or because of the increasing costs for each employee, the impact of overqualification of both types would appear to be increasing over the period.

The rising importance of overqualification is associated closely with the other trend we report in this paper, namely an increasing dispersion in the returns to graduate education. When we control for graduates being matched to graduate jobs there is no significant increase in the dispersion of returns (men) or the increase is substantially lower (women); but there is a notable fanning out of the "average" returns (without controlling for job matching) at the 90^{th} and 10^{th} quantiles during the last decade, according to both the QLFS and the Skills Survey series. Overqualification is thus a potentially fruitful way of describing and understanding such trends – in particular, one can see how the median quantile and OLS returns to graduate education can remain quite stable, while those in the lower quantiles experience declining returns because they contain rising proportions of overqualified workers who are experiencing greater pay penalties.

These findings do not imply that we are here empirically distinguishing between the pure human capital model of graduate pay and alternative models that bring in demand-side characteristics. It has been shown (and we have provided additional descriptive evidence in this paper) that some overqualification is itself related to lower ability (Green et al., 2002). For example, those with higher Maths achievements, and with higher class degrees, are *ceteris paribus* less likely to become overqualified. Overqualification also differs across degree subjects, and at least part of the cost of overqualification may be attributable to mismatches in particular subjects. Nevertheless, studies of the determinants of overqualification as a personal outcome, even when ability measures are included, also find a role for personal mobility constraints, and leave much variation that is unexplained (which could be attributable either to luck or, as in human capital theory, to unobserved ability). Our point is that, whatever the reason for overqualification, be it variable unobserved ability among graduates, market or structural rigidities, or temporary disequilibria, the idea of overqualification provides a tool for understanding the increasingly heterogeneous outcomes for graduates. It suggests that there remains some considerable value in continuing to track the prevalence, determinants and effects of overqualification.

To what extent do increasing dispersion of the college wage premium and rising overqualification matter? We conclude briefly with three observations concerning the implications of our findings for educational policy.

First, other writers have held that overqualification (and/or falling returns) implies that educational expansion by governments should be halted or reversed.[10] We find that this argument is not defensible. It is sometimes forgotten that state intervention should be premised upon the social rate of return and its difference from the private return. The social returns to graduate education in Britain, in the case of those who are privately overqualified, are unknown, but may be substantial. Adding to them the non-pecuniary private returns, and recalling the need for forward-looking estimates, it becomes apparent that economists' estimates of the historical pecuniary private returns to graduate education are never more than one part of the evidence required to form a scientific policy judgement. In general, the mere presence of overqualification does not imply that there are too many skills being supplied (Green and McIntosh, 2007). An

[10] Gray and Chapman (1999), for example , infer from the presence of overqualification that educational expenditures designed to reduce inequalities are wasted if the resulting skills are underutilised.

excess of skill could easily be deemed optimal if it induces skill-upgrading or skill-biased technological change (Acemoglu, 1998). Moreover, only a relatively small and as yet non-increasing proportion of graduates are both overqualified and under-utilising skills, with attendant consequences for job dissatisfaction. The importance in the aggregate of disappointed expectations may therefore have been exaggerated (Brown and Hesketh, 2004). Even should intervention to reduce overqualification be deemed advisable, policies to raise employers' demands for skill are arguably the appropriate response in the context of rising global competition.

Second, a plausible implication of rising dispersion and overqualification is that current and future cohorts of school leavers may perceive an increased risk of investing in higher education. Risk is also derived from uncertain course completion rates, but it is likely that the increased earnings dispersion will raise the perceived financial risks. If so, there would be expected to be some downward pressure on enrolments (Charles and Luoh, 2003). It may, therefore, be increasingly difficult for government to achieve targets for greater higher education participation if employees perceive the risks to be greater than other alternatives.

Finally, increased dispersion suggests there is a need for transparency and improved information available to young people making their choices about educational investments. Choosing courses with low pecuniary returns is potentially rational and can suit the life-style choices of many. A problem arises only if young people are led to expect higher pecuniary returns than they subsequently will experience. Diversity in the returns is to some extent foreseeable, given the available knowledge. Information on returns is costly for young people to acquire (and especially beneficial when returns are changing), yet relatively inexpensive for the state to disseminate. There is a case for improved state provision of such information as a public good. Since forward-looking information needs to be based on the latest evidence in a changing labour market, the annual publication of returns estimates, including their dispersion, should become a regular part of the state's contribution to aid private education choices. Since the data are already collected, the expenses for the state comprise only the computation and publication costs. We propose that publishing estimates of returns, obtained using open conventional methods, should become part of the remit of the UK's Office for National Statistics.

References

Acemoglu, D. (1998). "Why do new technologies complement skills? Directed technical change and wage inequality." Quarterly Journal of Economics 113 (4): 1055-1089.

Allen, J. and R. van der Velden (2001). "Educational mismatches versus skill mismatches: effects on wages, job satisfaction, and on-the-job search." Oxford Economic Papers 53(3): 434-452.

Ashton, D., B. Davies, A. Felstead and F. Green (1999). Work Skills In Britain. Oxford, SKOPE, Oxford and Warwick Universities.

Blundell, R., L. Dearden, A. Goodman and H. Reed (2000). "The returns to higher education in Britain: Evidence from a British cohort." Economic Journal 110: F82-F89.

Bratti, M., R. Naylor and J. Smith (2006). Different returns to different degrees? Evidence from the British Cohort Study 1970, University of Warwick, mimeo.

Brown, P. and A. Hesketh (2004). The Mismanagement of Talent. Oxford, Oxford University Press.

Budkria, S. and P. T. Pereira (2005). Educational Qualifications and Wage Inequality: Evidence for Europe. Bonn, IZA Discussion Paper No. 1763.

Charles, K. K. and M. C. Luoh (2003). "Gender differences in completed schooling." Review of Economics and Statistics 85(3): 559-577.

Chevalier, A. (2003). “Measuring Over-Education”. Economica 70(3): 509-531.

Chevalier, A. and J. Lindley (2007). Over-Education and the Skills of UK Graduates, LSE, Centre for the Economics of Education, DPCEEDP0079.

Connolly, S. and M. Gregory (2008). "Moving Down: Women's Part-time Work and Occupational Change in Britain 1991-2001." Economic Journal Forthcoming.

de Grip, A., Bosma, H., Willems, D. and van Boxtel, M. (in press). "Job-Worker Mismatch and Cognitive Decline." Oxford Economic Papers.

Dearing, R. (1997). Higher Education in the Learning Society. Norwich, HMSO.

Dickerson, A. and F. Green (2004). "The growth and valuation of computing and other generic skills." Oxford Economic Papers-New Series 56 (3): 371-406.

Dolton, P. and A. Vignoles (2000). "The incidence and effects of overeducation in the U.K. graduate labour market." Economics of Education Review 19: 179-198.

Dolton, P. and A. Vignoles (2000). "The incidence and effects of overeducation in the U.K. graduate labour market." Economics of Education Review 19: 179-198.

Elias, P. and K. Purcell (2004). "Is mass higher education working? Evidence from the labour market experiences of recent graduates." National Institute Economic Review(190): 60-74.

Felstead, A., D. Gallie, F. Green and Y. Zhou (2007). Skills At Work, 1986 to 2006. University of Oxford, SKOPE.

Felstead, A., D. Gallie and F. Green (2002). Work Skills In Britain 1986-2001. Nottingham, DfES Publications.

Freeman, R. B. (1976). The overeducated American. New York, Academic Press.

Frenette, M. (2004). "The overqualified Canadian graduate: the role of the academic program in the incidence, persistence, and economic returns to overqualification." Economics of Education Review 23(1): 29-45.

Gallie, D., M. White, Y. Cheng and M. Tomlinson (1998). Restructuring The Employment Relationship. Oxford, Clarendon Press.

Goos, M. and A. Manning (2007). "Lousy and lovely jobs: The rising polarization of work in Britain." Review of Economics and Statistics 89 (1): 118-133.

Gray, J. and R. Chapman (1999). "Conflicting Signals: The Labor Market for College-Educated Workers." Journal of Economic Issues XXXIII(3): 661-675.

Green, F., S. McIntosh and A. Vignoles (2002). "The utilization of education and skills: Evidence from Britain." Manchester School **70**(6): 792-811.

Green, F. and S. Mcintosh (2007). "Is there a Genuine Underutilisation of Skills Amongst the Over-qualified?" Applied Economics 39(4): 427-439.

Hartog, J. (2000). "Over-education and earnings: Where are we, where should we go?" Economics of Education Review 19: 131-147.

Johnson, W. R., P. C. Morrow, et al. (2002). "An evaluation of a perceived overqualification scale across work settings." Journal of Psychology 136(4): 425-441.

Machin, S. (2003). Wage inequality since 1975. The Labour Market Under New Labour. R. Dickens, P. Gregg and J. Wadsworth. Basingstoke, Palgrave Macmillan.

Martins, P. S. and P. T. Pereira (2004). "Does education reduce wage inequality? Quantile regression evidence from 16 countries." Labour Economics 11(3): 355-372.

Mason, G., (2002), High skills utilisation under mass higher education: graduate employment in service industries in Britain, *Journal of Education and Work*, Vol. 15, pp. 427-456

Maynard, D. C., T. A. Joseph, et al. (2006). "Underemployment, job attitudes, and turnover intentions." Journal of Organizational Behavior 27(4): 509-53

McGuiness, S. (2006). "Overeducation In The Labour Market." Journal of Economic Surveys 20(3): 387-417.

Pollmann-Schult, M. and F. Buchel (2004). "Career Prospects of Overeducated Workers in Germany." European Sociological Review 20(4): 321-331.

Purcell, K., P. Elias, R. Davies and N. Wilton (2005). The Class of '99. A study of the early labour market experiences of recent graduates, Warwick Institute for Employment Research.

Rubb, S. (2003). "Overeducation: a short or long run phenomenon for individuals?" Economics of Education Review 22(4): 389-394.

Sattinger, M. (1993) 'Assignment Models of the Distribution of Earnings,' Journal of Economic Literature, Vol. 31, pp. 831-880.

Sloane, P. J. (2003). Much Ado About Nothing? What does the Overeducation Literature Really Tell Us? Overeducation In Europe. F. Buchel, A. de Grip and A. Mertens. Cheltenham, Edward Elgar: 11-48.

O'Leary, N. C. and P. J. Sloane (2005). The Changing Wage Return to an Undergraduate Education in Great Britain, paper presented to Work and Pensions Economics Group.

Thurow, L. (1972). Generating Inequality: Mechanisms of Distribution in the U.S. Economy. . New York, Basic Books.

Vaisey, S. (2006). "Education and its discontents: Overqualification in America, 1972-2002." Social Forces 85(2): 835-864.

Walker, I. and Y. Zhu (2007), "The College Wage Premium, Overeducation, and the Expansion of Higher Education in the UK", presented at the Work Pensions and Labour Economics Study Group (WPEG) 2007 conference in Manchester.

Table A1

Quantile Regression for NVQ Level 4+, Men

LFS year group	Percentile 10th	20th	30th	40th	50th	60th	70th	80th	90th
94-96	0.332	0.353	0.370	0.353	0.332	0.328	0.315	0.275	0.275
	0.017	0.011	0.010	0.009	0.009	0.009	0.009	0.011	0.014
97-00	0.346	0.394	0.409	0.410	0.397	0.394	0.383	0.379	0.381
	0.012	0.009	0.008	0.008	0.007	0.007	0.008	0.009	0.012
01-03	0.323	0.384	0.413	0.411	0.409	0.402	0.395	0.392	0.380
	0.012	0.011	0.009	0.009	0.010	0.009	0.010	0.010	0.013
04-06	0.314	0.370	0.400	0.419	0.411	0.411	0.409	0.412	0.426
	0.013	0.011	0.011	0.010	0.010	0.010	0.011	0.013	0.015

Quantile Regression for NVQ Level 4+, Women

LFS year group	Percentile 10th	20th	30th	40th	50th	60th	70th	80th	90th
94-96	0.333	0.411	0.464	0.496	0.509	0.513	0.516	0.511	0.500
	0.011	0.009	0.007	0.007	0.007	0.007	0.007	0.009	0.013
97-00	0.295	0.402	0.454	0.486	0.514	0.526	0.525	0.521	0.495
	0.009	0.007	0.006	0.006	0.006	0.006	0.006	0.006	0.009
01-03	0.271	0.376	0.437	0.480	0.516	0.533	0.548	0.544	0.531
	0.010	0.008	0.007	0.007	0.006	0.007	0.007	0.009	0.010
04-06	0.274	0.367	0.445	0.493	0.529	0.544	0.558	0.551	0.539
	0.009	0.007	0.007	0.006	0.007	0.008	0.007	0.009	0.012

Standard errors in second row for each 3-year group

Table A2 Returns to Level 4+ at 10th, 50th and 90th Quantiles.

a) Men

Year/ Quantile	Average	Standard Error of Average	Matched	Standard Error of Matched
1992: 90	0.440	0.050	0.460	0.059
1992: 50	0.347	0.049	0.425	0.040
1992: 10	0.389	0.037	0.493	0.042
1997: 90	0.450	0.045	0.477	0.071
1997: 50	0.375	0.037	0.443	0.035
1997: 10	0.323	0.037	0.437	0.030
2001: 90	0.488	0.055	0.512	0.053
2001: 50	0.453	0.040	0.517	0.041
2001: 10	0.348	0.042	0.488	0.050
2006: 90	0.520	0.050	0.581	0.040
2006: 50	0.445	0.033	0.564	0.045
2006: 10	0.257	0.018	0.528	0.027

b) Women

Year/ Quantile	Average	Standard Error of Average	Matched	Standard Error of Matched
1992: 90	0.489	0.056	0.542	0.061
1992: 50	0.391	0.025	0.474	0.032
1992: 10	0.284	0.033	0.369	0.041
1997: 90	0.558	0.041	0.567	0.056
1997: 50	0.541	0.033	0.595	0.041
1997: 10	0.484	0.035	0.562	0.068
2001: 90	0.561	0.046	0.625	0.059
2001: 50	0.533	0.023	0.623	0.029
2001: 10	0.308	0.032	0.562	0.031
2006: 90	0.717	0.017	0.772	0.023
2006: 50	0.561	0.013	0.685	0.017
2006: 10	0.269	0.016	0.531	0.012

Source: Skills Survey series. All quantile regressions also include lower educational levels and matches to jobs, a quadratic in work experience, and industry and regional dummies; the omitted category is “no qualifications matched to a job requiring no qualifications”.

“Average” means not conditioning for whether or not the employee is overqualified.

“Matched” means conditioning on being employed in a graduate job.

Returns are relative to level 2 (GCSE Grades A-C or equivalent).

For more information on the Manpower Human Resources Laboratory, please call 020 7955 7285, or email j.m.cantlay@lse.ac.uk

Manpower Human Resources Laboratory
Centre for Economic Performance
London School of Economics
Houghton Street
London WC2A 2AE
Web: www.lse.ac.uk/manpower