

THE RETURNS TO ACADEMIC AND VOCATIONAL QUALIFICATIONS IN THE UK

Andy Dickerson

1 July 2006

Abstract

This paper investigates returns to qualifications in the UK during the first five years of the new millennium. Formal qualifications, especially higher level qualifications, continue to receive substantial returns despite the rapid qualification 'upgrading' of the workforce that is taking place. Returns are similar for men and women in full-time employment, but are greater for academic than for vocational qualifications. While there are some concerns regarding the labour market value of lower level - particularly vocational - qualifications, given that these are still associated with significantly higher employment probabilities, they clearly are still of value in the labour market.

Keywords: Education and training

JEL codes: J24, J31, I2

Address: Warwick Institute for Employment Research, University of Warwick, Coventry CV4 7AL, UK. e: a.p.dickerson@warwick.ac.uk; t: +44 24 765 22672; f: +44 24 765 24241

Acknowledgements: This research is based on the quarterly Labour Force Survey series compiled by ONS Labour Market Statistics Group and Department of Finance and Personnel (Northern Ireland), Central Survey Unit, and supplied by the UK Data Archive at the University of Essex. The data are Crown copyright. Neither the ONS nor the Data Archive bear any responsibility for the analysis or interpretation of the data reported here. The research was commissioned by the UK Department of Trade and Industry (DTI). The author would like to thank the project manager, Dr David Campbell, and the other members of the steering committee for their input and helpful comments during the course of the project. However, the opinions expressed in this paper are those of the author and do not necessarily reflect the views of the DTI.

THE RETURNS TO ACADEMIC AND VOCATIONAL QUALIFICATIONS IN THE UK

1. Introduction

This paper presents the labour market returns to qualifications in the UK during the first five years of the new millennium. We focus on differences in the rate of return - or wage premiums - to academic and vocational qualifications, as well as on the impact that qualifications have on labour market outcomes, distinguishing between employment, unemployment and economic inactivity.

A number of previous studies have examined the returns to qualifications in the UK using the same dataset as utilised here - namely the UK Labour Force Survey (LFS). For example, Dearden *et al* (2002) examine the returns to different types of qualification held using data from the 1998 LFS. Dearden *et al* (2004) present a detailed investigation of the returns to National Qualifications Framework (NQF¹) level 2 qualifications, with particular attention on the most common of these which is National Vocational Qualification (NVQ) level 2, using LFS data for 1996Q1 to 2002Q1. Finally, some investigation of the variation in rates of return has been conducted within these two studies and, in particular, by McIntosh (2002) who examines heterogeneity in returns utilising LFS data for 1993 to 2001Q2. Thus, the first objective of this paper is to update these previous studies in order to see whether the rapid qualifications 'upgrading' that the UK labour force is currently experiencing is having any impact on the rates of return. Since these returns are conditional on individuals being in employment, a second objective of this paper is to investigate the relationship between qualifications and labour market outcomes on a consistent and systematic basis. Throughout the paper, we utilise the NQF classification of qualifications.

¹ See <http://www.qca.org.uk/>. The NQF is congruent (although not identical) to the International Standard Classification of Education (ISCED) used by the OECD and Eurostat.

The next section describes the data and methodology. Section 3 examines the distribution of qualifications held. The relationship between qualifications and labour market status is also reported, where status is defined as being in work (employed or self-employed), unemployed (and looking for work) or economically inactive. Section 4 presents estimates of earnings functions and reports the average returns² to each qualification level. Section 5 investigates the importance of different qualifications levels for an individual's labour market status. Finally, some discussion and potential explanations for the patterns observed are presented in the conclusion.

2. Data and methodology

The UK Labour Force Survey (LFS) is a quarterly representative sample survey of households living at private addresses in the UK. Individuals are interviewed on five successive occasions, although questions regarding their earnings are only asked in the first and fifth waves. Two strategies are used to amalgamate the quarterly LFS samples. First, we utilise data from twenty quarterly LFS from 2000Q1 to 2004Q4 to produce a series of five annual datasets corresponding to 2000, 2001, 2002, 2003 and 2004. These datasets comprise around 60-65,000 working-age men and women for each year. Second, we also pool the data over the whole five year period (using only observations from wave 1 of each quarterly survey so that individuals are included only once). This pooling has the advantage that it provides larger datasets (over 160,000 observations for men and for women), which is important for some of the more disaggregated analyses undertaken. Pooling is legitimate since our preliminary analysis revealed relatively small differences in the estimated rates of return to qualifications in the annual datasets. This is consistent with the results of McIntosh (2002) who also found that the estimated returns to separate qualifications appear to change

² While we follow the common terminology in using the expression 'rate of return', the reported returns are actually wage premiums. They are not rates of return in the strict sense since there is no attempt to take into account the costs of obtaining the qualifications in computing the 'return', nor to calculate a 'rate' by taking account of the length of time taken to achieve the different qualifications. However, following Dearden *et al* (2002), we do also consider the annualised returns which take into account the time taken to achieve typical post-compulsory schooling qualifications.

remarkably little over time for his analysis based on LFS for 1996 through to 2001. Thus, the apparent consistency in rates of return over time is further supported by the analysis reported here. To facilitate the presentation of results, we mainly focus on the pooled data. However, we also illustrate the *range* of estimates produced using the annual datasets in order to illustrate the variation in the estimated returns. This provides a secondary indication of the robustness of the reported rates of return in addition to their statistical significance.

Following the established literature, we estimate a Mincerian earnings function which controls for individual and workplace characteristics. Thus, for each of the annual datasets, and for the pooled data, we estimate an equation of the form:

$$\ln w_i = \beta' X_i + \gamma' Q_i + \varepsilon_i \quad (1)$$

where w is hourly wages, X is a vector of individual and workplace characteristics controlling for other factors which might account for differences in pay, and Q is a vector of dummy variables identifying the qualifications held by the individual.

Since 1996, the LFS has recorded *all* qualifications that individuals hold, rather than just their three highest qualifications as in the LFS prior to that date. This allows indicators for all qualifications to be included in contrast to just including an indicator of the highest qualification achieved as in some other studies. By including all qualifications, the estimated rates of return are the *average* return across all individuals who have this qualification, rather than being the return to those who have obtained the particular qualification as their highest achievement. If returns are independent of any further qualifications obtained, then these two rates will be the same. But if those who go on to achieve higher qualifications are different from those who do not - as will certainly be the case - then the 'average' return to all who hold the qualification will differ from the 'marginal' return to those who hold it as their highest qualification. Given that lower level qualifications are prerequisites for many programmes of study/training for higher level qualifications, the estimation of returns should take account of this necessity of having some qualifications in order to obtain others. This is accomplished by

including indicators of all qualifications. The total return to reaching a higher level qualification can then be obtained by summing the returns to the qualifications required to obtain that level, while the incremental return for the additional level can be obtained directly from the estimated coefficient. This is also the methodology adopted by Dearden *et al* (2002) and McIntosh (2002) and hence is consistent with these previous studies.

Qualifications also impinge upon labour market outcomes. This is often ignored despite its implications for selection into employment and hence on the conditional wage returns. Thus, for example, not only do those with higher qualifications tend to earn more, they also have a lower risk of being unemployed. They are also more likely to be in the labour force, rather than being economically inactive. Using a multinomial logit specification, the returns to qualifications in terms of the marginal probability of being in various labour market states are also calculated. Thus we estimate:

$$P(Y_i = j) = \frac{\exp(\beta'_j X_i + \gamma'_j Q_i)}{\sum_{k=1}^J \exp(\beta'_k X_i + \gamma'_k Q_i)}, \quad j = 1, \dots, J \quad (2)$$

where j is labour market status. We consider the impact of qualification levels on the probabilities of being (i) in work (employee or self-employed); (ii) (ILO) unemployed; or (iii) economically inactive. Once again, we include indicators of all qualifications rather than just the highest qualification attained.

3. Qualifications and labour market status

3.1 The distribution of qualifications held

The LFS records up to 11 qualifications for each individual, with a series of subsidiary questions being asked if certain qualification types are reported.³ As Table 1 shows, almost 50 different qualification types can be separately identified. Clearly, some qualifications are held by very few individuals, while others are held by a large proportion of the working age

³ In a typical quarterly LFS, only one or two individuals ever record as many as 11 qualifications so this would not appear to be a limitation.

population.⁴ An investigation of the average returns to these separate qualification types (or at least an aggregated set of qualifications where they are particularly sparse) is reported in Dearden *et al* (2002) and McIntosh (2002).⁵ However, given that many qualifications are only held by very small fractions of the working age population, it is difficult to obtain robust estimates of their individual rates of return. Hence, we aggregate the detailed qualifications into the five standard NQF levels as classified in the first column of Table 1, while distinguishing between academic (A) and vocational (V) qualifications.

For many of the NQF levels, a single qualification type dominates. For example, most men having qualifications categorised at level 4V (i.e. vocational qualifications at level 4) have an HNC/HND as shown in row 35 of Table 1. The other qualifications at level 4V are held by very few men and clearly it is not possible to obtain robust estimates of the returns to each of these separate qualifications. Aggregation provides one feasible strategy, and because of the domination by a single qualification type at many levels, the returns can be closely associated with these 'typical' qualifications in many cases. Thus the estimated returns to level 4V qualifications for men reported below will essentially be driven by the estimated returns to an HNC/HND.

The only type of qualification where the classification into one of the five NQF levels is somewhat problematic is trade apprenticeships. While some can be regarded as being at level 3V,⁶ many are at level 2V. Moreover, in the LFS, a separate question is asked regarding apprenticeships rather than this information being gathered with the other

⁴ Changes over time are reported in Dickerson (2005). The recent further expansion in higher education in the UK is beginning to be seen in the increasing proportion of the working age population with a first degree. Similarly, while Modern Apprenticeships may ultimately reverse this trend, there is a declining proportion of men with an apprenticeship qualification as older workers for whom this was a relatively common post-compulsory training programme reach retirement age. In general, new(er) qualification types that have been added more recently to the curricula of different education and training institutions and agencies (e.g. NVQ, GNVQ, BTEC) are held by an increasing proportion of the working age population, while older and more traditional qualification types (e.g. City & Guilds, RSA, ONC/OND) are in relative decline. This is a pure cohort effect.

⁵ McIntosh (2002), for example, uses 26 separate qualification types.

⁶ This is the category to which Modern Apprenticeships were originally assigned, although an increasing proportion of MAs are now being undertaken only to level 2.

qualifications. Because some apprenticeships will have been certificated with a formal qualification such as City & Guilds, the same qualification can be recorded twice. For the methodology utilised in this paper, such double-counting is not problematic since we estimate the returns to every qualification held. Hence given the reasonably large proportion of the working age population which has completed an apprenticeship, we treat apprenticeships as a separate qualifications category in the analysis which follows.⁷

The other category treated separately is 'other professional/vocational qualifications/foreign qualifications'. As shown in row 47 of Table 1, such qualifications are held by around 30% of the working age population. Clearly, this catch-all category may capture a myriad of different qualifications and at different levels, and thus it cannot be categorised into a single NQF category. However, given the high preponderance for these other qualifications in the workforce, clearly they should not be ignored. Thus, rather than randomising according to estimates of the composition of this category, we prefer to include 'other' as a separate qualification category in the analysis below.⁸

Table 2 presents the results of aggregating the different qualifications into the five NQF levels. First, it is noticeable that men are less likely to have no qualifications than women, and that a much higher proportion of both men and women have academic qualifications than have vocational qualifications. Second, for academic qualifications, men are less likely to hold low level qualifications but slightly more likely to hold higher level qualifications than women. These patterns are changing as women now out-perform men at every level of compulsory and post-compulsory education. For example, at level 4A, the small remaining gap between men and women is driven by the higher proportion of men than women who have a first degree. However, as has been well documented, women now comprise

⁷ For a detailed analysis of the returns to trade apprenticeships in the UK, see McIntosh (2004).

⁸ One 'rule-of-thumb' suggestion is that approximately 10% of these other professional/vocational qualifications/foreign qualifications are at level 3, 35% are at level 2 and 55% are at level 1. However, there would appear to be no estimates of the proportions of academic and vocational qualifications within these shares at each level. The DfES is reported to be undertaking research into this issue.

significantly more than half of all UK undergraduate students, and hence if this trend continues, the gap will soon be closed (and then reversed).

Third, for vocational qualifications, the main differences between men and women are at level 1 and level 3. At level 1, a much higher proportion of women have a low level RSA qualification as seen in line 5 of Table 1. For many, especially older, women, this may be a traditional secretarial/typing qualification gained early in their careers or even while still at school. In contrast, the gender gap at level 3 vocational qualifications is due to the relatively high proportion of men holding a City & Guilds advanced craft/part 3 certificate, often associated with apprenticeship-type training. Given the historic tradition of this type of training, there are also large differences in the proportions of men and women who have completed an apprenticeship.

Finally, in aggregate, for both men and women, there is an increasing proportion of working age individuals at each qualification level, consistent with the cohorts entering the labour force being better qualified as compared to those already in the labour force and/or those that are retiring (see Dickerson, 2005). Thus the UK workforce is becoming more and more qualified. This qualifications upgrading of the UK labour force is driven primarily by the increasing proportions of individuals holding academic qualifications - the trends in the proportions holding vocational level qualifications are less marked.

3.2 Qualifications and labour market status

We categorise labour market status as being in work (i.e. in employment or self-employed), unemployed (according to the standard ILO definition) or economically inactive (excluding students). Table 3 reports the NQF qualification levels for each of these three labour market states separately for men and women.

The first row of Table 3a indicates that for working age men, 12.9% of those in work had no qualifications, as compared to more than one fifth of the unemployed, and almost two fifths of the economically inactive. It is evident that those in work are more likely to hold higher level academic and/or vocational qualifications than those seeking work or the inactive. However, it is also apparent that those in work are also more likely to hold intermediate level qualifications (some of which, of course, will have been obtained as pre-requisites to obtaining higher level qualifications). For both men and women, similar proportions of individuals in work and unemployed hold lower level qualifications. This suggests that, at least considered separately, these low level qualifications do not convey any 'employability' advantage. However, they are clearly positively associated with being in the labour market rather than being economically inactive.

The economically inactive hold significantly fewer academic and vocational qualifications at each level than those in the labour market. The single exception is for apprenticeships - a large proportion of the inactive have undertaken apprenticeships and, for men in particular, a much higher proportion than amongst the unemployed. These inactive individuals with apprenticeships are primarily older workers, many of whom will have worked in more traditional (heavy) manufacturing industry in the past but are now economically inactive due to temporary or long-term sickness/disability according to their responses to the economic activity question in the LFS.

As well as investigating the qualifications held by those in different labour market states as in Table 3a, it is also of interest to examine the different labour market status for all those holding each qualification level. This is shown in Table 3b. Thus the first row of Table 3b indicates that of all men with no qualifications, 61% are in work, 8% are unemployed and more than 30% are economically inactive. While a much higher proportion of both men and women have academic than have vocational qualifications at each level as shown in Table 2 above, both academic and vocational qualifications are associated with quite similar

probabilities of being in work. There is a monotonic-increasing relationship between qualification level and the probability of being in work for both academic and vocational qualifications and for both men and women, with the biggest increment (by far) between no qualifications and level 1 qualifications.

Unemployment probabilities fall with increasing levels of both academic and vocational qualifications and, as expected, very few individuals holding high level qualifications are unemployed. The relationship between qualification levels and the probability of being economically inactive is more complex however. Women have relatively high inactivity rates which are associated with child bearing-and-rearing in particular. However, women who have achieved higher level academic and/or vocational qualifications are rather more likely to be in the labour force (and in employment rather than unemployed), than those with low level or no qualifications, consistent with opportunity cost considerations for labour market (non-) participation. For men, inactivity is less common than for women and varies comparatively little between different qualification levels - approximately 5-6% of men are inactive irrespective of the academic qualifications held. This probability is slightly higher for men with vocational qualifications at 8-9%. Finally, around 12% of men and 23% of women with apprenticeships are economically inactive.

These summary statistics confirm that those with higher level qualifications are more likely to be in work and are less likely to be unemployed or economically inactive.⁹ These patterns are stable over time as shown in Dickerson (2005).

4. Returns to academic and vocational qualifications

This section presents estimates of the rates of return to the five NQF qualification levels. The analysis treats men and women separately,¹⁰ and is also restricted to full-time employees

⁹ This 'selection' into employment by those with more and higher level qualifications has well-known implications for the estimation of rates of return to those qualifications as discussed in the next section.

only since part-time employment is highly concentrated both occupationally and sectorally.¹¹ This restriction also avoids the complex issues that arise over the choice of hours and participation decisions, and to some extent, mitigates the problems caused by the selection into employment, since these are known to be especially acute with respect to women's part-time employment. Many previous studies of the returns to qualifications also focus only on full-time workers so using the same restriction here ensures comparability with this earlier research.

Estimation of the earnings functions is by ordinary least squares (OLS). However, we are aware that there are a number of potential biases that arise in the estimation of earnings functions – (unobserved) ability bias, measurement error bias, selectivity bias, and family background bias (see, for example, Dearden *et al*, 2002; Card, 1999; Card, 2001; Blundell *et al*, 2005). These can result in biased estimates of rates of return when using OLS. While several strategies are available to mitigate the impact of these problems, a number of previous papers have shown that such biases would appear to approximately cancel out and that using OLS with the LFS can provide reasonable estimates of the rates of return to education in Britain (see, for example, Dearden, 1999, Dearden *et al* 2002, *inter alia*). We will rely on this serendipity as our justification for using least squares.

The dependent variable is (log) hourly pay as recorded in the LFS. The control variables included are: age and age squared (to capture the non-linear impact of potential labour market experience), ethnicity (6 categories), firm size (6 categories), public sector, industrial sector (9 categories based on SIC92 divisions), and region of work (21 categories based on Government Office Regions). This is a fairly standard set of controls for estimates of this

¹⁰ Pooling by gender is formally rejected and, in any event, it is perceived that there is a more acute selection problem into employment for women than men (although this selection problem is then rarely tackled formally, perhaps because of the difficulty in finding a suitable instrument for employment). Moreover, it is clear from the summary statistics presented above that the qualifications held by men and women tend to differ.

¹¹ The self-employed are excluded because they are not asked the earnings questions.

kind. Figure 1 illustrates the conditional returns for NQF level 1 to level 5 with the base category being no qualifications.¹² Recall that the reported returns are the average (rather than the marginal) return to all who have achieved the particular qualification level. Thus they can be interpreted as the expected increase in hourly pay for an individual who holds each qualification level as compared to an individual who does not have a qualification at that level, *ceteris paribus*. The solid bars are the estimated returns (calculated as $\exp(\gamma) - 1$) using the pooled data. The estimated coefficients are all statistically significantly different from zero in part because the large sample sizes enable the regression coefficients to be estimated very precisely. Rather than presenting the (very small) standard errors, for each qualification level, the vertical capped bar depicts the maximum and minimum rate of return obtained using the five separate annual datasets. This gives clear indication of the stability over time and the consistency with which the magnitudes of the various rates of return are estimated.¹³

There are a number of interesting features to note from the results presented in Figure 1. First, the returns to each qualification level are fairly constant over time – and any observed variability is substantially less than the differences between qualification levels. The pooled results therefore satisfactorily summarise the year-by-year results. Second, there are only quite small differences between the rates of return for men and women for equivalent qualification levels. Third, the estimated returns to level 1 qualifications are negligible or even slightly negative. This suggests that earnings differ little between those with no qualifications (the base category) and those with level 1 qualifications. However, there may still be advantages of having level 1 qualifications in terms of employability (as will be investigated below), and because they facilitate obtaining higher level qualifications which do receive a positive rate of return. Fourth, for level 2 and higher qualifications, the rates of return are

¹² Full results are reported in Dickerson (2005).

¹³ The standard errors for the estimates for the pooled data and for each of the annualised datasets are all given in Dickerson (2005). For each of the annual datasets, the estimated rates of return are again all statistically significantly different from zero, despite having substantially smaller datasets than for the pooled data.

high. Given that indicators of all qualifications levels are included in the estimated earnings functions, these estimated rates of return can be cumulated. Thus, for example, a woman with level 3 and level 4 qualifications can expect to earn approximately 45% more per hour than an otherwise identical woman (in terms of her age, ethnicity etc) with only a level 2 qualification but no more. The equivalent calculation for a similarly qualified man is a premium of 40% more than his lesser qualified counterpart.¹⁴

Figure 2 presents the results when the qualification levels are distinguished between academic and vocational. The results for academic qualifications look quite similar to the aggregated results in Figure 1. This is unsurprising given that the majority of qualifications held are academic rather than vocational as seen in Table 1, and thus these tend to dominate when academic and vocational qualifications are combined. The estimated returns are very different for vocational level qualifications however. While the pattern and level of returns is again not dissimilar for men and women (with the exception of a rather greater return to level 4 for women), they clearly differ substantially from the returns to academic qualification levels. First, the negative returns to low level vocational qualifications as reported elsewhere (e.g. Dearden *et al*, 2004) are clearly apparent. For level 1 and level 2 vocational qualifications, the returns are significantly negative and the returns at level 3 are also very low.¹⁵ Second, the incremental returns are larger for higher level vocational qualifications than for lower level vocational qualifications, and are highest for level 5. Finally, there are generally higher rates of return to academic than to equivalent level vocational qualifications. The exception is at level 5 where, for both men and women, the returns to level 5V are greater than for level 5A. The former includes professional qualifications at post-degree level (such as chartered accountancy or membership of professional institutes),

¹⁴ This cumulative calculation ignores the potential interactions among qualifications, but to the extent that higher level qualifications are frequently only obtained after intermediate level pre-requisites are completed, this illustrative computation is probably not inappropriate.

¹⁵ Some caution in interpretation is needed here, in that these low level vocational qualifications are more likely to be held by individuals with low potential earnings, and hence there is a negative correlation between wages and the probability of holding these particular qualifications. Therefore, they do not imply that on obtaining a level 1 vocational qualification, an individual would incur a loss in earnings for example.

whilst the latter are mainly post-graduate academic qualifications such as masters and doctorates.¹⁶

There are a number of possible explanations for the rather different patterns observed in the returns for academic and vocational qualifications. First, the results may reflect issues in the measurement of NVQ/GNVQ/BTEC qualifications, where only the *highest* level is recorded in the LFS for these particular qualifications. As noted by McIntosh (2002), given the hierarchical nature of the certification for these kinds of qualification, if an individual holds, say, an NVQ at level 3, then technically they should have the skills necessary to obtain NVQ level 2 and below by definition. Some may indeed have the lower level certificates, but these are not reflected in the LFS where only the highest level NVQ is recorded. Thus we have effectively estimated the returns for these qualifications for those individuals who have them as their *highest* qualification. These can be expected to be lower, in general, than the returns across the whole population of those who have these qualifications since the more able will tend to progress on to still higher level vocational qualifications. We experimented with awarding individuals who hold higher level NVQ/GNVQ/BTECs all of the lower level qualifications of the same type, but the results were unaffected by this change.

A second possible explanation is the different degrees of interactions/interdependencies between academic and vocational qualification levels. Thus, for example, there is a clear and dominant route through the academic qualification structure, from 5 or more GCSEs, through to 2 or more A-levels and then on to higher education. In contrast, any pathway through the vocational qualification structure is typically less well-defined. As a consequence, there is more variation in individuals' portfolios of vocational qualifications. Related to this is the fact that each vocational NQF level amalgamates a rather more diverse range of qualifications

¹⁶ There is quite considerable variability over time in the estimated returns to level 5 vocational qualifications for women. This is caused mainly by a low estimated return for 2004, a year for which the listed responses identifying level 5V changed slightly in the LFS questionnaire. This may account for the difference, although it is not clear why the estimated rate should be adversely affected for women but not for men.

that the academic NQF levels, and that typically, within each of the vocational levels, there is not such a strong dominance of one particular type of qualification, as is apparent for each of the academic levels.

Finally, before concluding that the returns to academic qualifications are greater than to vocational qualifications, it is important to recall that these 'earnings premiums' are not really 'rates of return'. Costs also need to be taken into account including, in particular, the opportunity costs of foregone earnings. Given that vocational qualifications are typically obtained with fewer years of study than the equivalent level academic qualification, then the 'annualised' returns may be more similar. For level 3 and higher qualifications - that is, for qualifications taken after compulsory schooling has been completed - we undertake a similar exercise to that presented in Dearden *et al* (2002). Specifically, we use the full-time equivalent (FTE) years of study time estimates from Dearden *et al* and apply these to the estimates of the earnings premiums accruing to academic and vocational level qualifications as summarised in Figure 2. The results of this exercise are summarised in Table 4. At each qualification level, we use the qualification type which is held by most individuals at that level. Thus, for example, for level 3A, we use 2 or more A-levels for both men and women since these are the most common achievement at this level as shown in Table 1. A similar approach is used for the other 'typical' qualification levels. For higher level qualifications, we assume that any lower level qualifications required will have been obtained and thus we can cumulate the estimated returns. They reveal that the annualised rates are quite similar for vocational and academic qualifications at each NQF level and are also not dissimilar at each successively higher level.¹⁷

¹⁷ The exception is at level 3V, particularly for women for which the 'typical' qualification is NVQ3. We have assumed that this takes 1 year of FTE study but this is probably an overestimate – many NVQ3 level courses are taken part-time over the course of a year. If the equivalent full-time study is only 6 months, then the annualised rate would be double and much closer to the rates for other qualification levels.

5. Labour market outcomes

As well as the higher pay expected from successively higher levels of qualifications for those in work, qualification levels also impact upon the chances of individuals being in employment, unemployed or economically inactive. Figure 3 presents the estimates for the impact of the five NQF qualification levels on the conditional marginal probability of being in work rather than being unemployed or economically inactive derived from the multinomial logit specification in equation (2). For both men and women, each qualification level is associated with a significantly higher probability of being in work. In comparison to the base of no qualifications, it is apparent that larger increases in the probability of being in work are obtained by women than men for each qualification level, *ceteris paribus*: for women, the impact is 6-10% higher for each qualification level, while for men, the magnitude is about 3-5%.¹⁸

Figure 4 presents the marginal effects on in-work probability separately for academic and vocational qualification levels. For women, all academic and vocational qualification levels significantly increase the probability of being in work. In contrast, for men, not only are the increases in the probability of being in work less than for women as seen at the aggregate level in Figure 3, but for level 1 vocational qualifications, the impact of holding a qualification at this level is actually negative. However, in total, only about 1% of the male workforce have a level 1 vocational qualification as their *only* qualification (since most of those holding a qualification at this level also have higher level vocational or some academic qualifications which will serve to increase their in-work probability). Thus, the impact of holding a qualification on the probability of being in work detrimentally affects only a very small proportion of the labour force.

¹⁸ These estimates combine employees with those in self-employment. Distinguishing these two types of employment reveals that, conditional on being in work, qualifications of all levels reduce the likelihood of self-employment for men, while for women the results differ between qualification levels and are imprecisely estimated reflecting the fact that self-employment is comparatively rare for women.

Comparable results are obtained for the impact of different qualification levels on being unemployed or economically inactive (see Dickerson, 2005, for details). The conditional probability of being unemployed is significantly higher for those with no qualifications as expected, and every extra qualification level serves to successively reduce this probability. The difference in unemployment probabilities are small (1-2% for each qualification level), but this is unsurprising given that the period over which the estimates are obtained was a period of relatively low aggregate unemployment in the UK. Level 1V and level 2V qualifications however, have a perverse effect and serve to increase unemployment probabilities of both men and women. In contrast, even level 1 academic qualifications serve to significantly reduce an individual's probability of unemployment.

The impact of different qualification levels on the probability of being in the labour force rather than economically inactive is particularly strong for women: each qualification level is associated with a 6-8% marginal probability of being in the labour force, *ceteris paribus*, whereas the comparable results for men are around 2-3%. Both vocational and academic qualification levels have a similar sized impact, which is interesting given that the returns are typically lower for the former than the latter and hence the opportunity costs of not working correspondingly less. This may reflect that fact that several – especially newer - vocational qualifications are obtained while in work (or as the direct outcome of experiential learning while at work). For men, academic qualifications are more important than vocational qualifications for labour market attachment.

All of these results are consistent with a simple opportunity cost model: for those holding qualifications, the cost of not working is higher the more qualifications that are held as shown in Section 4 of this paper, since the returns to all qualification levels are positive. Thus, the probability of being in the labour force, and in particular of being in employment, is significantly higher for those with academic qualifications and higher level vocational qualifications than for those with only low level or no qualifications.

6. Conclusions

This paper presents a detailed investigation of the labour market returns to qualifications in the UK during the first five years of the new millennium. We present estimates of the rate of returns and the impact on labour market status for qualifications at each level of the NQF classification, separately for men and women, and distinguishing between academic and vocational qualifications at each level. We also report differences in these returns over time.

One important contribution of this paper is to update the previous research and thus our first conclusion is that, in general, the findings reported in Dearden *et al* (2002) for 1998 and McIntosh (2002) for the period to 2001Q2 are confirmed for the period 2000-2004. Thus, we find that the returns to qualification levels at level 2 and above are positive and significant for both men and women. These returns are estimated robustly and are invariant over the time period under consideration despite the substantial qualification upgrading that is continuing to take place in the UK labour market. Moreover, the rates of return are quite substantial – around 12-15% for both level 2 and level 3 qualifications, rising to more than 20% for level 4 and level 5 qualifications for both men and women. At level 1, however, the return is negligible or zero for both men and women.

Distinguishing between academic and vocational qualifications reveals some important differences. The pattern of returns for academic qualifications replicates quite closely the results for aggregated qualifications since more individuals have academic than vocational qualifications at every qualification level. In contrast, the returns for vocational qualifications are quite different. With the exception of level 5, the returns to academic qualifications are greater than those to vocational qualifications at every level. Moreover, the returns to vocational level qualifications at level 1 and level 2 are negative for both men and women, and are very low (less than 5%) at level 3. However, there are increasing incremental returns to higher and higher vocational qualifications, such that at level 5V returns exceed those to level 5A.

In general, successive qualification levels are also associated with significantly higher probabilities of being in work as opposed to being unemployed or economically inactive. The effects are greater for women than men at each qualification level. For men, academic qualifications have a larger impact than vocational qualifications, while for women, both types have largely similar marginal effects. The magnitude of the impact for each of the NQF levels level is broadly similar, and thus even low level qualifications are associated with significantly higher in-work probabilities.

The evidence presented in this paper indicates that formal qualifications, especially higher level qualifications, continue to receive large positive returns in the UK labour market. There is no evidence to suggest that there is an excess supply of qualified individuals despite the qualification-upgrading of the workforce that is taking place. However, the results do suggest some concerns regarding the labour market value of lower level - especially vocational - qualifications. Nonetheless, given that these qualifications are still associated with significantly higher employment probabilities, they clearly are still of value in the labour market. But continued support is needed to ensure that individuals who have these low level qualifications as their *highest* qualification level use them as a stepping-stone to progress to higher qualification levels.

REFERENCES

- Blundell R, Dearden L and Sianesi B (2005), "Measuring the Returns to Education" Chapter 7, pp.117-145 in Machin S and Vignoles A (eds.), *What's the Good of Education?*, Princeton: Princeton University Press.
- Card D (1999), "The Causal Effect of Education on Earnings", in Ashenfelter O and Card D (eds.), *Handbook of Labor Economics, Vol 3*, Elsevier-North Holland.
- Card D (2001), "Estimating the return to schooling: Progress on some persistent econometric problems", *Econometrica*, 69, 1127-1160.
- Dearden L (1999), "Qualifications and Earnings in Britain: How reliable are conventional OLS estimates of the returns to education?", WP W99/7, IFS.
- Dearden L, McIntosh S, Myck M and Vignoles A (2002), "The Returns to Academic and Vocational Qualifications in Britain", *Bulletin of Economic Research*, 54, 249-274.
- Dearden L, McGranahan L and Sianesi B (2004), "An in-depth analysis of the returns to National Vocational Qualifications obtained at level 2", mimeo, June 2004, IFS.
- Dickerson A P (2005), *A study on rates of return to investment in level 3 and higher qualifications*, DTI, December 2005.
- Dolton P and Vignoles A (2002), "The Return on Post-compulsory Mathematics Study", *Economica*, 69, 113-141.
- Machin S and Vignoles A (eds.) (2005), *What's the Good of Education?*, Princeton: Princeton University Press.
- McIntosh S (2002), *Further Analysis of the Returns to Academic and Vocational Qualifications*, DfES Research Report No. 370.
- McIntosh S (2004), "The returns to apprenticeship training", CEP DP 622, March 2004.
- O'Leary N C and Sloane P J (2005), "The Return to a University Education in Great Britain", mimeo, Department of Economics, University of Wales Swansea.
- Office for National Statistics. Labour Market Statistics Group and Department of Finance and Personnel (Northern Ireland). Central Survey Unit, *Quarterly Labour Force Survey* [computer file]. Colchester, Essex: UK Data Archive [distributor]

Table 1: The distribution of qualifications and allocation to NQF levels

NQF level	Qualification	All	Male	Female
1	no qualification	18.2%	16.9%	19.6%
2 level 1A	any poor GCSE or equiv.	20.5%	19.2%	21.9%
3 level 1A	< 5 GCSE or equiv. passes	35.5%	32.5%	38.7%
4 level 1A	1 AS-level	0.4%	0.4%	0.5%
5 level 1V	RSA other	5.0%	0.9%	9.4%
6 level 1V	City & Guilds found 1	1.7%	1.9%	1.5%
7 level 1V	BTEC 1st cert	0.3%	0.3%	0.4%
8 level 1V	NVQ1	1.1%	1.0%	1.3%
9 level 1V	GNVQ foundation	0.3%	0.2%	0.3%
10 level 1V	YT certificate	0.5%	0.5%	0.6%
11 level 1V	SCOTVEC modules	0.7%	0.6%	0.8%
12 level 2A	1 A-level	2.8%	2.5%	3.2%
13 level 2A	2/3 AS-levels	0.3%	0.3%	0.3%
14 level 2A	5+ GCSE passes	37.4%	35.4%	39.6%
15 level 2A	1 or 2 SCE highers	0.7%	0.5%	0.8%
16 level 2V	RSA diploma	0.2%	0.1%	0.4%
17 level 2V	City & Guilds craft 2	2.4%	3.5%	1.2%
18 level 2V	BTEC 1st diploma	0.3%	0.3%	0.4%
19 level 2V	NVQ2	3.3%	2.5%	4.1%
20 level 2V	GNVQ intermediate	0.7%	0.6%	0.8%
21 level 3A	2+ A-levels	17.7%	17.8%	17.5%
22 level 3A	4+ AS-levels	0.2%	0.2%	0.3%
23 level 3A	3+ SCE highers	2.1%	2.0%	2.2%
24 level 3A	CSYS	0.3%	0.2%	0.3%
25 level 3V	ONC/OND	2.0%	3.1%	0.9%
26 level 3V	RSA advanced cert or dip	0.1%	0.0%	0.3%
27 level 3V	City & Guilds advanced 3	3.6%	6.0%	1.0%
28 level 3V	BTEC national dip or cert	1.7%	1.6%	1.9%
29 level 3V	NVQ3	2.4%	2.0%	2.8%
30 level 3V	GNVQ advanced	0.8%	0.7%	0.9%
31 level 2/3V	trade apprenticeship	12.3%	20.6%	3.5%
32 level 4A	first degree	14.1%	14.9%	13.3%
33 level 4A	other HE	1.0%	0.9%	1.1%
34 level 4A	HE diploma	1.6%	1.3%	1.9%
35 level 4V	HNC/HND	4.4%	6.2%	2.5%
36 level 4V	teaching: FE	0.5%	0.4%	0.7%
37 level 4V	teaching: secondary	0.8%	0.6%	0.9%
38 level 4V	teaching: primary	0.7%	0.2%	1.3%
39 level 4V	nursing	2.3%	0.5%	4.1%
40 level 4V	RSA higher diploma	0.1%	0.0%	0.1%
41 level 4V	BTEC higher	0.3%	0.4%	0.3%
42 level 4V	NVQ4	0.4%	0.4%	0.5%
43 level 5A	higher degree	3.2%	3.9%	2.5%
44 level 5V	other degree	1.2%	1.6%	0.8%
45 level 5V	teaching PGCE	0.8%	0.6%	1.1%
46 level 5V	NVQ5	0.1%	0.1%	0.1%
47 other	other pro/voc/OS quals	30.2%	32.7%	27.5%
	NOBS	330,795	166,446	164,349

Table 2: NQF qualification levels by gender

Level	All	Male	Female
no qualifications	18.2%	16.9%	19.6%
Academic			
level 1A	39.8%	36.8%	43.0%
level 2A	38.3%	36.2%	40.6%
level 3A	20.0%	19.9%	20.0%
level 4A	15.9%	16.3%	15.4%
level 5A	3.2%	3.9%	2.5%
Vocational			
level 1V	9.1%	5.1%	13.4%
level 2V	6.7%	6.7%	6.6%
level 3V	9.9%	12.4%	7.3%
level 4V	9.0%	8.3%	9.7%
level 5V	2.1%	2.3%	2.0%
Either/both			
level 1	43.5%	38.8%	48.5%
level 2	42.9%	41.0%	44.9%
level 3	29.0%	31.4%	26.4%
level 4	22.3%	22.3%	22.3%
level 5	5.3%	6.1%	4.5%
apprenticeship	12.3%	20.6%	3.5%
other	30.2%	32.7%	27.5%
NOBS	330,795	166,446	164,349

Notes to Table 1 and Table 2:

1. Pooled LFS 2000-2004. All of working age – i.e. male aged 16-64, female aged 16-59 inclusive.
2. Level1-level5 are the 5 levels of the NQF classification; the suffix A (V) denotes academic (vocational) qualifications. The figures in the table are the proportions of the sample holding each qualification or qualification level.
3. Trade apprenticeships may be at either vocational level 2 or level 3 (Table 1, line 31), but may also be separately certificated (e.g. with City & Guilds diploma). Thus they are treated separately in the analysis – see text for details.
4. 'Other' denotes 'other professional/vocational qualifications/foreign qualifications' (Table 1, line 47) which are not distinguished in the LFS and therefore cannot be classified further. As with apprenticeships, these are treated as a separate category – see text for further discussion.

Table 3a: Qualification levels by labour market status

		Male			Female		
		in work	unemp	inactive	in work	unemp	inactive
no qualifications		12.9%	22.2%	39.1%	13.1%	17.6%	39.6%
Academic	level 1A	39.9%	52.3%	15.5%	47.5%	59.9%	28.1%
	level 2A	39.6%	41.9%	17.6%	47.0%	49.7%	21.9%
	level 3A	22.0%	23.3%	9.2%	23.8%	26.3%	9.0%
	level 4A	18.0%	8.7%	8.0%	18.3%	9.5%	7.0%
	level 5A	4.3%	1.8%	1.8%	3.0%	1.4%	1.0%
Vocational	level 1V	5.1%	5.1%	4.3%	14.3%	8.5%	10.4%
	level 2V	6.9%	5.6%	4.3%	7.1%	5.8%	4.9%
	level 3V	13.4%	6.1%	7.9%	8.4%	5.1%	3.9%
	level 4V	9.0%	3.1%	5.6%	11.4%	3.4%	4.9%
	level 5V	2.5%	0.5%	1.5%	2.5%	0.5%	0.8%
Either/both	level 1	41.8%	54.1%	18.2%	53.1%	62.7%	33.0%
	level 2	44.6%	45.9%	21.1%	51.4%	53.4%	25.5%
	level 3	34.3%	28.7%	16.5%	31.2%	30.6%	12.5%
	level 4	24.3%	11.1%	12.1%	26.3%	12.0%	10.9%
	level 5	6.8%	2.3%	3.3%	5.4%	1.9%	1.8%
apprenticeship		21.3%	5.9%	19.8%	3.6%	1.1%	3.4%
other		34.2%	17.4%	26.0%	29.9%	17.0%	20.6%
NOBS		136,684	15,335	21,560	119,744	13,503	38,611

Table 3b: Labour market status by qualification levels

		Male			Female		
		in work	unemp	inactive	in work	unemp	inactive
no qualifications		61.2%	7.7%	31.1%	46.9%	3.6%	49.5%
Academic	level 1A	88.8%	5.4%	5.9%	79.2%	4.0%	16.8%
	level 2A	89.7%	3.6%	6.7%	83.4%	2.8%	13.8%
	level 3A	90.2%	3.4%	6.4%	85.8%	2.6%	11.6%
	level 4A	90.6%	3.1%	6.3%	86.5%	2.7%	10.9%
	level 5A	91.7%	2.4%	5.9%	87.8%	2.6%	9.6%
Vocational	level 1V	81.9%	7.1%	11.0%	77.7%	3.7%	18.6%
	level 2V	86.0%	5.7%	8.4%	77.4%	4.8%	17.9%
	level 3V	88.6%	3.3%	8.1%	84.3%	2.9%	12.8%
	level 4V	89.0%	2.4%	8.6%	86.2%	1.7%	12.1%
	level 5V	89.7%	1.7%	8.6%	89.5%	1.6%	8.9%
Either/both	level 1	88.0%	5.5%	6.5%	78.8%	4.0%	17.3%
	level 2	89.1%	3.9%	7.0%	82.6%	3.1%	14.4%
	level 3	89.6%	3.4%	7.0%	85.4%	2.7%	12.0%
	level 4	90.1%	2.9%	7.0%	86.0%	2.3%	11.7%
	level 5	91.0%	2.2%	6.9%	88.6%	2.2%	9.3%
apprenticeship		85.2%	2.5%	12.2%	75.2%	2.1%	22.7%
other		86.2%	3.5%	10.3%	79.0%	3.1%	18.0%
NOBS		136,684	15,335	21,560	119,744	13,503	38,611

Notes to Table 3a and Table 3b:

1. Pooled LFS 2000-2004. All of working age – i.e. male aged 16-64, female aged 16-59 inclusive.
2. Labour market status: in work = employee or self-employed; unemp = ILO unemployed; inactive = neither in work nor ILO unemployed (nor student).
3. The numbers in Table 3a are the percentages of individuals of working age in work, unemployed or inactive holding qualifications of each type.
4. The numbers in Table 3b are the percentages of individuals of working age in the three different labour market states for each qualification level.

Table 4: Annualised earnings premiums

Men			
NQF level:	'typical' qualification	total FTE years of study	annualised rate
Academic level 3	2+ A-levels	2	7.1%
Academic level 4	First degree	5	7.1%
Academic level 5	Higher degree	8	6.4%
Vocational level 3	ONC/OND	1.25	4.6%
Vocational level 4	HNC/HND	3.25	8.5%
Vocational level 5	Other degree/CA	8	7.4%

Women			
NQF	'typical' qualification	total FTE years of study	annualised rate
Academic level 3	2+ A-levels	2	6.7%
Academic level 4	First degree	5	7.2%
Academic level 5	Higher degree	8	6.7%
Vocational level 3	NVQ3	1	2.6%
Vocational level 4	Nursing qualification	4	7.7%
Vocational level 5	PGCE	6	9.5%

Notes to Table 4:

1. Pooled LFS 2000-2004; full-time equivalent (FTE) years of study estimates from Dearden *et al* (2002).
2. We use ONC/OND as the typical vocational level 3 qualification for men because although a higher proportion have City & Guilds Advanced, this is often (but not always) associated with apprenticeships for which there is a supplementary premium and, in addition, it is very difficult to assign a 'typical' full-time equivalent study time for this qualification.
3. Other degree for vocational level 5 qualification for men is assumed to be 3 years for an accountancy qualification, but arguably, this does not require full-time study. However, even if this is assumed to take only 2 years equivalent full-time study, the annualised rate only increases to 8.5%.
4. In cumulating the returns from successive qualification levels, we assume that the interdependencies do not significantly affect the magnitudes of the estimated rates of return.

Figure 1: Returns to aggregate qualifications by gender`

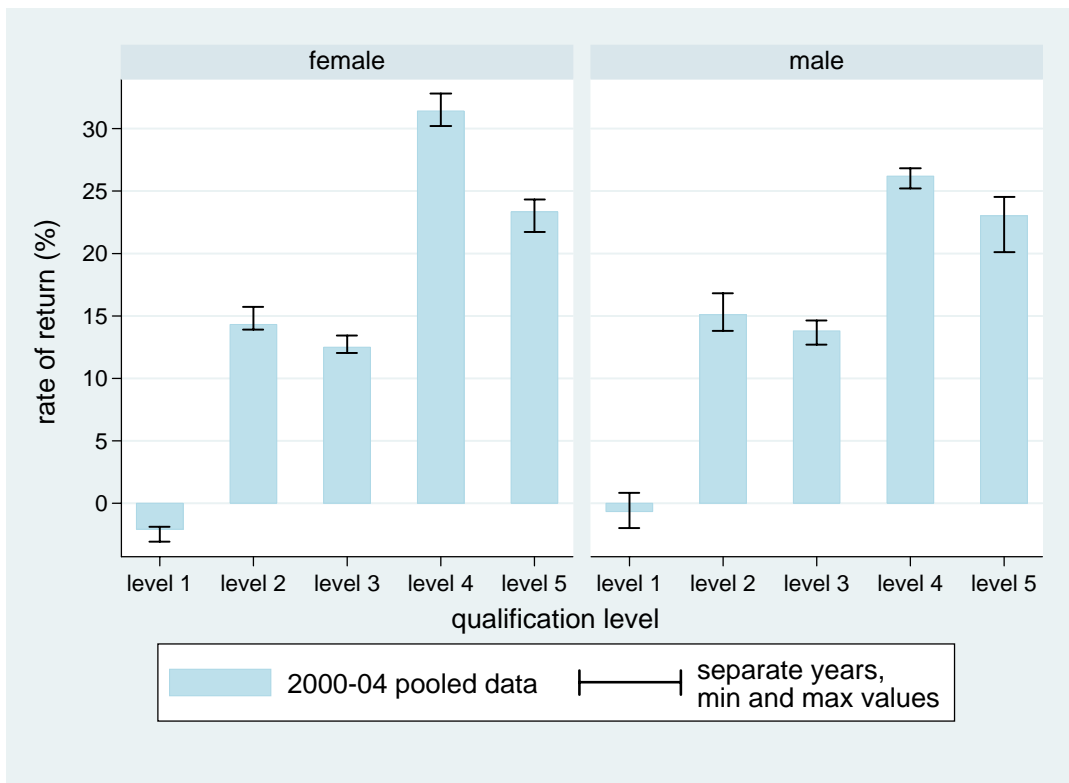


Figure 2: Returns to disaggregate qualifications by gender

Figure 2A: ACADEMIC QUALIFICATIONS

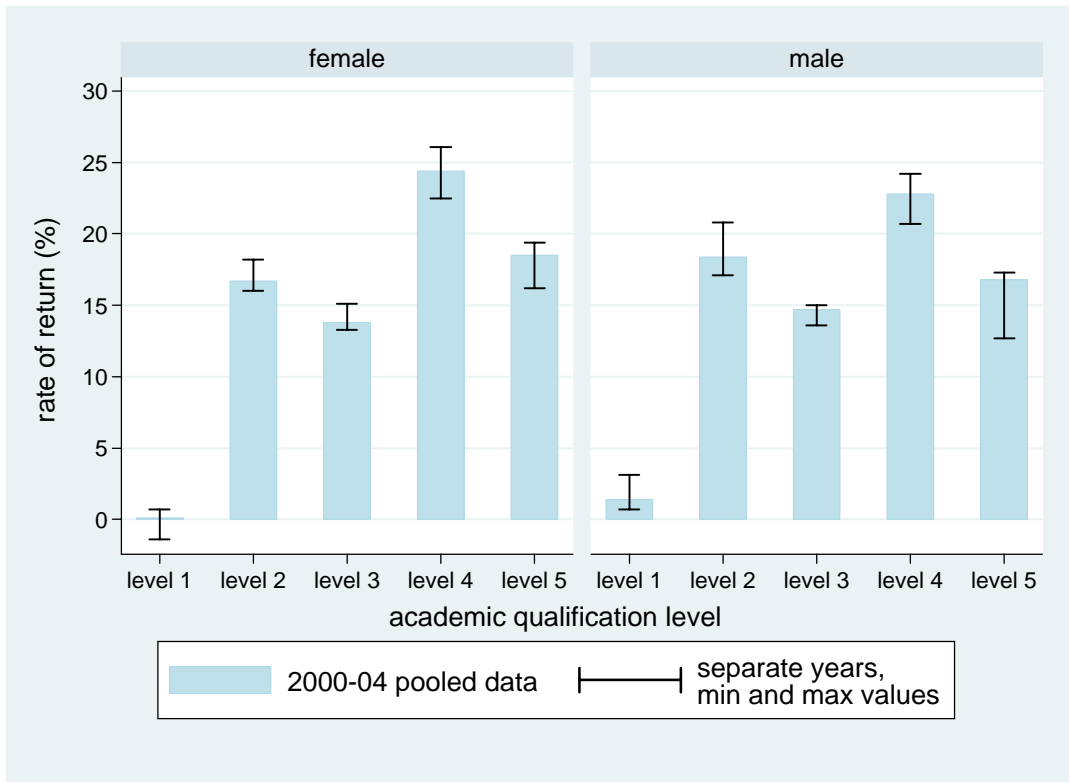


Figure 2V: VOCATIONAL QUALIFICATIONS

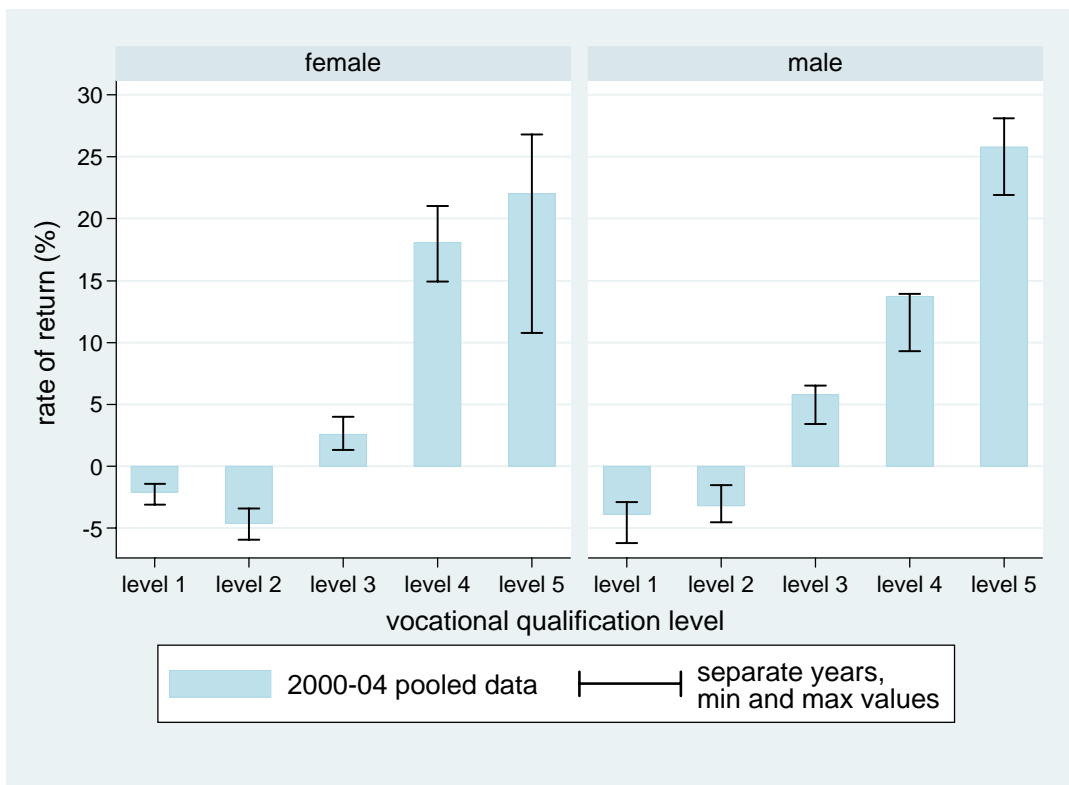


Figure 3: Aggregate qualifications and in-work probability by gender

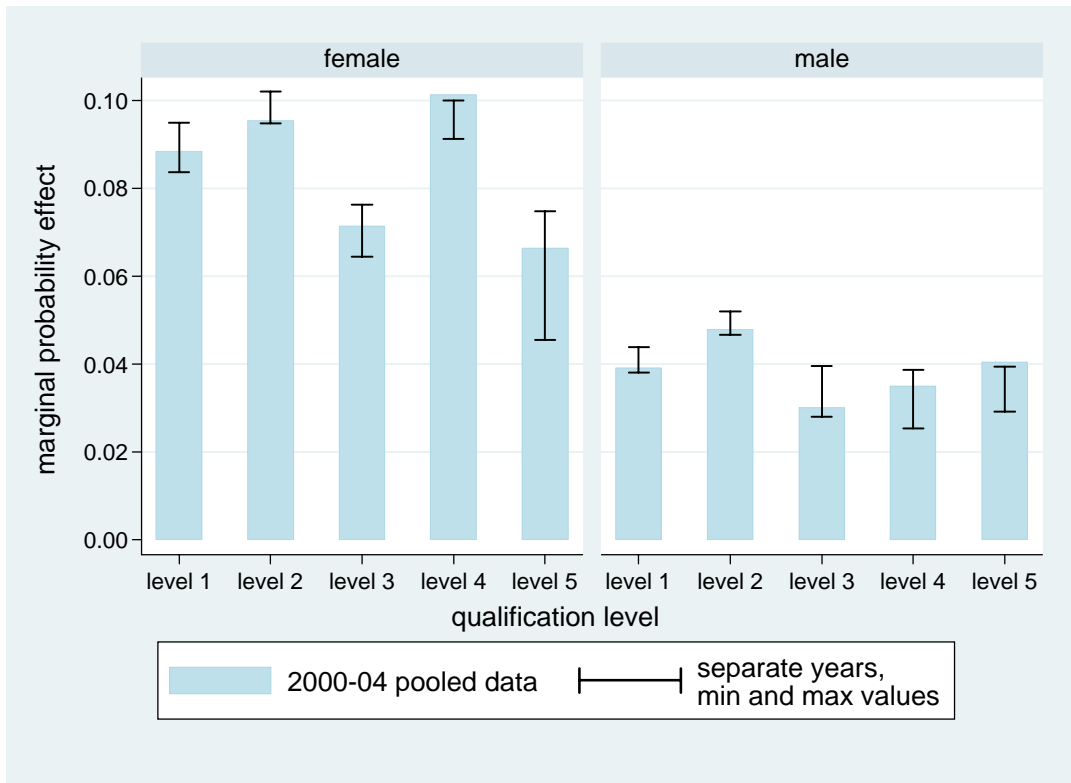


Figure 4: Disaggregate qualifications and in-work probability by gender

Figure 4A: ACADEMIC QUALIFICATIONS

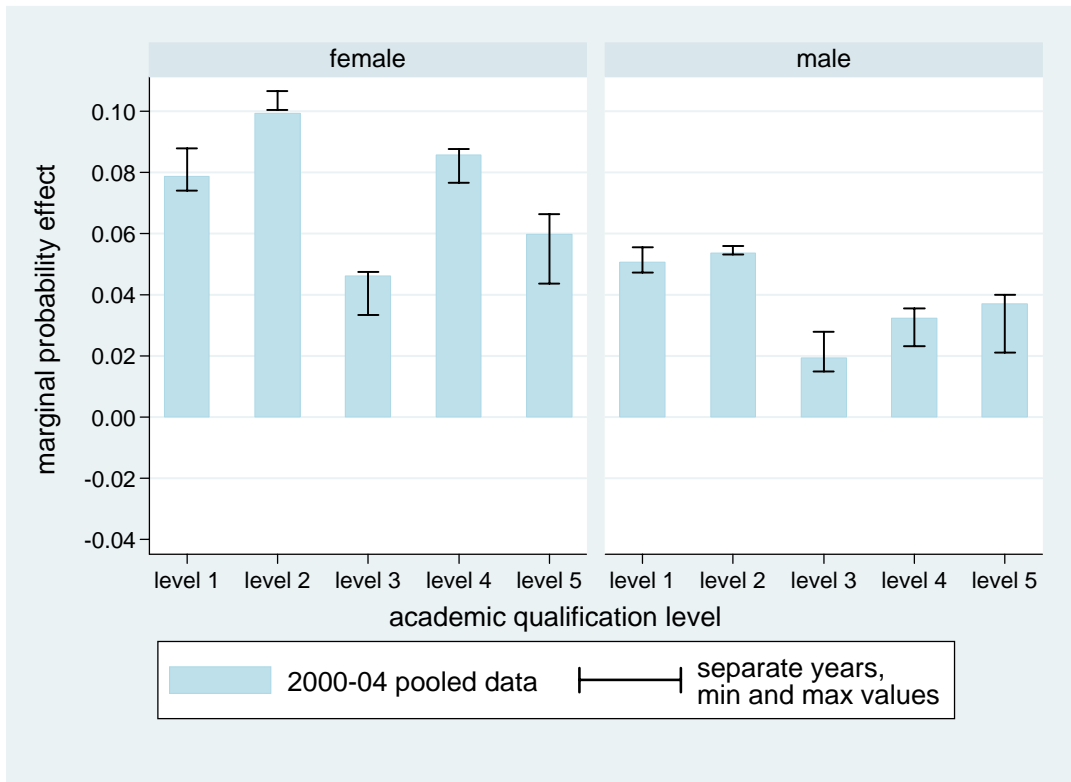


Figure 4V: VOCATIONAL QUALIFICATIONS

