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The Returns to Apprenticeship Training

Steven McIntosh

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Abstract
This paper uses recent data from the UK Labour Force Survey to estimate the wage gains that individuals make on average if they complete an apprenticeship programme. The results suggest gains of around 5-7% for men, but no benefit for women. Further analysis extends the results by considering the returns by age group, by qualification obtained, by highest prior qualification and by industrial sector. A key finding emerging from this further analysis is the importance of acquiring qualifications with the apprenticeship, at level 3 or above.

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Steven McIntosh is a Research Officer in the Centre for Economic Performance, London School of Economics, as part of the Education and Skills group.
Email: s.mcintosh@lse.ac.uk

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1. Introduction

After a period of decline beginning in the early 1980s, largely associated with the removal of supports and the introduction of cheaper, less-valued alternative training schemes such as the Youth Training Scheme (YTS) and its successors, apprenticeship training was suddenly re-invigorated in the UK with the introduction of the Modern Apprenticeship in 1994 by the then Conservative Government, in a reversal of previous policy. A continued commitment to such apprenticeship training was then provided by the incoming Labour Government, in the process defining Modern Apprenticeships as Advanced Modern Apprenticeships (AMAs), and introducing Foundation Modern Apprenticeships as a replacement for National Traineeships. Apprenticeships are seen as a means of improving the country's skill base in terms of the intermediate level skills required to perform craft, technician and associate professional jobs. It is precisely these skills that were identified in the audit undertaken by the National Skills Task Force (DfEE, 2000) as the ones in which the UK is lacking, either relative to competitor countries or relative to the skills that surveys reveal employers are demanding. In addition, a successful apprenticeship system is seen as a way of providing further education post-16 for those without an academic leaning who do not continue their education along the general route into A levels. Apprenticeships are therefore intended to provide a structured vocational route to intermediate and higher level skills, which the UK has lacked.

Various studies have evaluated the success of the Modern Apprenticeship scheme so far[1]. It is not the intention of this paper to repeat these analyses. Suffice to say that while the initiative is generally applauded, the outcomes reveal further room for improvement, in terms of numbers involved in apprenticeship training, quality of training provided, completion rates and qualification attainment. The aim of this paper is to examine the value attached to the receipt of apprenticeship training in the UK by the labour market. Such an analysis is useful in two respects. First, the value placed on apprenticeship training can be used to justify the costs of the investment in such training by the parties involved. Such costs are borne by the government/society, in terms of the direct costs of the training provision, by employers in terms of supervision time devoted to apprentices, administration costs and the costs of any materials used by the apprentices, and by the apprentices themselves in terms of the lower wages received during their apprenticeship than they otherwise would earn in a full-time,

[1] See for example Steedman, Gospel and Ryan, 1998; Steedman, 2001.

non-training job. With information on such costs it would be possible to undertake a full cost-benefit analysis of apprenticeship training, calculating both private and public rates of return. For the individual trainee, the private rate of return would compare the benefits, in terms of higher future earnings, to the costs of foregone earnings while training. For the employer, the value of the apprenticeship can also be measured in terms of the higher wages received by those who complete an apprenticeship relative to those who do not, under the assumption that wages paid to workers reflect their contribution to output (i.e. their marginal product). This benefit can again be compared to costs, in this case the provision costs of the employer, to calculate the private rate of return to the firm. Finally, from society's point of view, the higher wages received by those with apprenticeship training can again be used to indicate society's productivity gain[2], to be compared to the costs of all parties involved as described above, to arrive at a social rate of return.

Unfortunately such calculations are very difficult to undertake, due to limited information on the costs incurred by the various parties. While information on the costs of training provision to the government is available, little is known about the direct costs incurred by the employers[3], or the indirect costs incurred by the trainees themselves in terms of the wage that they otherwise would have received had they not been in training[4].

This paper therefore takes a more limited perspective, and concentrates on the benefits that result from apprenticeship training, in terms of higher wages to the former apprentices (which in turn indicate the higher productivity benefits to the employer and to society in general). Despite not being a full cost-benefit analysis, there remains the second use of the findings shown here, in terms of an information source. It has been claimed, for example by Steedman *et al* (1998), that one of the reasons that Modern Apprenticeships have attracted fewer numbers than hoped for is a lack of information provided about them to potential trainees. The results presented here provide an idea of the expected benefits to undertaking an apprenticeship, so that individuals can perform their own cost-benefit analysis to determine the appropriateness of such training for themselves, assuming of course that they have knowledge of their own costs in terms of the wages they would otherwise earn if they

[2] Additional benefits to society can occur if there are externalities, or knock-on effects, that result from the higher productivity of the former trainee, for example if the output of work colleagues is increased due to the presence of the former trainee, perhaps due to shared knowledge or assistance. Such additional benefits are necessarily more difficult to quantify than the direct effect of training on the trainee's own productivity.

[3] See, however, useful case study evidence on employers' costs in a recent paper by Hogarth and Hasluck (2003).

[4] Attempts to calculate what trainees would have earned had they not been in training have been made by Payne (2001) using data from the Youth Cohort Study to compare the wages of those involved in AMAs and 'other GSTs' to those in a full-time job.

chose not to partake in an MA programme. In a similar way, the findings about the wage gains attached to apprenticeships will provide employers with information about the productivity gains that result from apprenticeship training, and so facilitate similarly informed cost-benefit decision making by firms about whether they should supply such training places, again assuming that they have knowledge of their own personal costs of provision.

Thus knowledge of these returns can play an important role in the decision-making of various parties, leading to more informed choices being made. Ultimately this should hopefully improve the UK's skill base, through more firms offering and more individuals taking up apprenticeship places, if of course they prove to be profitable to the parties. If they do not, then the results provide a recognition that apprenticeships are not successful, and that alternative training systems need to be found.

The following section describes the data set to be used and the methodological approach, before the results are set out in detail. The final section offers some concluding thoughts.

2. Data and Methodology

This paper uses data from the UK Labour Force Survey (LFS) for the years 1996-2002. The LFS is a nationally representative, quarterly survey, interviewing about 120,000 individuals, in around 60,000 British households, and carried out by the Office for National Statistics. Respondents remain in the LFS for five consecutive quarters, after which they are replaced by a new incoming group. For our purposes, we are only interested in those respondents of working age who supply information on their current gross wages. Until 1997, only respondents being interviewed for the final time, in wave 5, were asked to report their gross wages. From 1997 onwards, respondents are asked about their gross wages both when they are first interviewed, wave 1, and when they are last interviewed, wave 5. In all years, the data collected in each quarter are pooled to produce annual data sets. The pattern of wage questions across waves ensures that no individual appears more than once in a pooled annual data set, either before or after 1997. In all years, only employees are asked about their gross wages, thus excluding the self-employed from the analysis. The resulting data sets vary in

size from around 35,000 individuals in 1996, to around 70,000 individuals in the years 1997-2002.

The other key variable of interest is obviously the identification of individuals who have undertaken an apprenticeship. The LFS includes a question asking respondents whether they have completed a trade apprenticeship. Unfortunately there are no follow-up questions to obtain more information that might have been useful, for example whether qualifications were obtained as part of the apprenticeship, and in what area (industry) the apprenticeship was obtained. Possible solutions to this absence of information are described later.

The LFS also contains very detailed information on all qualifications held by individuals, both of a general (academic) and of a vocational nature[5]. The analysis that follows will focus on the vocational qualifications that respondents hold. There are numerous such qualifications, identified by their issuing body. The key ones used here are those issued by City and Guilds, at Advanced Craft, Craft and Foundation levels[6], those issued by the Business and Technician Education Council (BTEC), at Higher National Certificate/Diploma (HNC/HND), Ordinary National Certificate/Diploma (ONC/OND) and First Certificate/Diploma levels[7], and the newer National Vocational Qualifications (NVQs) and General National Vocational Qualifications (GNVQs)[8], issued at levels 1-5 for NVQs and at foundation, intermediate and advanced levels (equivalent to levels 1-3 respectively) for GNVQs.

The methodology adopted in the analysis is OLS, regressing the log of hourly wages against an indicator of whether an individual has completed a trade apprenticeship, and various control variables. In particular, the estimated equations control for age, ethnicity, region, workplace size and sector of work (public or private sector)[9]. The interpretation of the coefficient on the apprenticeship variable is then the average percentage difference in wages between individuals who have completed an apprenticeship, and those who have not, holding

[5] Prior to 1996, the LFS asked respondents simply to list their highest three qualifications. Since the analysis that follows benefits from knowing all qualifications held by respondents, this effectively determines the starting date to be 1996.

[6] There are also significant numbers of respondents to the LFS who indicate that they hold City and Guilds qualifications, but are unsure as to which level. They were therefore included as a separate category in the analysis.

[7] The difference between diplomas and certificates at each level is that the former are studied for full-time at an institute of Further or Higher Education, while the latter are taken by part-time candidates usually in employment. In the context of apprenticeship, it is therefore likely that the certificates will be awarded.

[8] NVQs were originally intended to certify the possession of relevant skills in a workplace setting, while GNVQs were less occupation-specific and more likely to be taught outside work. The distinction has blurred somewhat with the provision of full-time NVQ courses in FE colleges.

[9] In addition, separate equations are estimated for men and women, since the available literature suggests that different wage-generating mechanisms seem to be at work for the genders.

constant these other factors. Clearly, the group who have not undertaken an apprenticeship will be a heterogeneous group, comprising, amongst others, high-fliers who have followed an academic route to first degree level or beyond, as well as the least successful who have acquired no qualifications. It is therefore important to also control for all other qualifications held. Then, if two individuals hold the same qualifications, whatever they might be, with the exception that one has also completed an apprenticeship while the other has not, then the expected difference in their earnings is given by the regression coefficient on the apprenticeship variable. In this way, we observe the average value placed on apprenticeships by the labour market.

Of course, this value could still be a biased estimate of the true value, if there are unobserved differences between the individuals who undertake an apprenticeship and those who do not, and if these unobserved characteristics influence wages. Such unobserved characteristics are likely to include inherent ability and family background, both of which can be expected to differ systematically with the apprenticeship variable, and also to influence wages. This, of course, is a well-known problem connected with any estimate of the returns to education. Usually, the acquisition of education is said to be positively related to unobserved ability and family background, leading to a positive bias on the estimated return to that education. In the case considered in this paper, the sign of any bias depends on whether successful apprentices are of above or below average ability and family background. There seems no clear reason for making a priori predictions about this in either direction.

Following the discussion of the average returns to apprenticeship, the paper then continues by looking for variation in the returns around this average. A key finding of interest would be how the returns vary according to the qualifications obtained, if any, during the apprenticeship. Unfortunately, as mentioned above, the questionnaire does not ask for this information. It is known, however, which vocational qualifications each individual holds, so the analysis proceeds by examining whether the returns to apprenticeship vary according to vocational qualifications held, although it must be remembered that these qualifications were not necessarily acquired during the period of apprenticeship training.

By the very nature of the analysis proposed, it is backward-looking, relying on information about previous apprentices to predict the returns to apprenticeships in the future. Given that the type of apprenticeships undertaken, and indeed the whole labour market itself, have changed drastically over the last 25 years, with a decline in manufacturing and manual work, and a growth in services and non-manual jobs, the results derived in the analysis may give a misleading picture of what we can be expected in the future. Another breakdown of

the results is therefore undertaken, focussing only on those respondents aged under 30 at the time of their interview. By focussing on such individuals, the results obtained should be more relevant to young people today, who desire information about the value of apprenticeships.

The analysis to this point assumes that the value of an apprenticeship is the same for all individuals who embark on such training. Although returns were allowed to vary above by the type of qualification obtained, there has so far been no allowance made for the differences in the returns by prior qualifications held. It could be the case, however, that an apprenticeship may prove more valuable to individuals who have not been successful in academic qualifications, compared to those who have achieved such success. Obviously there are many prior qualifications that could be considered. The analysis will focus here on prior qualifications obtained at school. Four different categories will be considered, namely those who left school with no formal qualifications, those who hold at best GCSEs at grade D or below, those who hold up to 4 GCSEs at grade C or above, and those whose highest school qualification is at least 5 GCSEs at grade C or above.[10]

Finally, it would be interesting to know which apprenticeships are the most valuable in terms of skills learnt. Unfortunately, as mentioned above, the LFS does not provide any such information. What can be observed is what the former apprentices are doing at the time of the survey, thus allowing an analysis of the returns to apprenticeships in particular industries, providing an indicator of the sectors where apprenticeships are most valued. Note that such results do not tell us automatically where an apprentice will earn the most money, since such calculations would be influenced by well-documented inter-industry wage differentials whereby some industries seem to be inherently higher paying. Rather the results indicate the industries where there is the largest difference between the wages of those with an apprenticeship and those without (holding constant other factors), and so provides a more accurate indicator of the worth attached to apprenticeships, rather than simply the average level of pay by industry in general. We examine the eighteen most populated industries with a significant proportion of former apprentices, to ensure that sample sizes are sufficiently large.

[10] There is another group, namely those individuals who acquired A levels at school. However, very few undertake an apprenticeship after acquiring A levels, and so such individuals are omitted from the analysis of returns by highest school qualification.

3. Results

3.1 The returns to apprenticeship

Tables 1 and 2 show, separately for men and women, the returns to apprenticeship for the years under consideration, namely 1996-2002. As described in the previous section, the estimated equations control for all other qualifications held, both academic and vocational, as well as age, ethnicity, region, size of workplace and sector of work. The returns to the various vocational qualifications are also shown in Tables 1 and 2, as these are linked to apprenticeships, as will be developed in the following sections.

Considering males first, Table 1 reveals that the gain in wages following the successful completion of an apprenticeship, holding other factors constant, has been remarkably stable over the period analysed, being on average in the range 5%-7% in each of the years. This is a statistically and economically significant number. If we wanted to make comparisons with academic qualifications, then the returns to acquiring 2 or more A levels are in the range 14%-17%. Of course, to make a fully informed decision on the relative worth of investing in these two types of human capital, it is also necessary to consider the costs of the investment, in terms of wages foregone, and any tuition costs. Such information is not readily available. What can be said is that the apprentice will typically earn a wage, albeit less than a full wage, while being trained, while the A level student is more likely to be studying full-time and so not earning at all. The costs of apprenticeship training are therefore likely to be lower than the costs of A level study, and so a comparison of their *rates* of return will yield more similar results than the difference in the raw returns above would suggest.

Comparing the apprenticeship returns to the returns on the vocational qualifications in Table 1, they are similar to those attached to City and Guilds qualifications at the Craft level. Surprisingly perhaps, an Advanced Craft City and Guilds qualification does not add much over and above the returns to the Craft level qualification[11], the return to the former being at its highest at 5% in 1997, and sometimes statistically insignificantly different from zero in other years. If an individual is progressing through the City and Guilds hierarchy of qualifications, therefore, the real gains seem to come at the Craft level. Turning to the BTEC qualifications, the highest ranked qualification, the HNC/HND, has the largest return, of

[11] Since all qualifications are included in the estimated equations, rather than simply highest qualification held, the coefficients represent the *additional* returns specifically to acquiring each qualification, and are cumulative across any combination of qualifications.

12%-14%, while at the lower, ordinary level (ONC/OND), the return is slightly lower, 7%-11%, but still above that attached to apprenticeships. BTEC qualifications at the lowest level do not consistently attract statistically significant returns across all years, and their returns are below those of apprenticeship in every year except 1996. Finally turning to the newest qualifications, the NVQ/GNVQs, the returns to such qualifications do not appear to be very good at all, even at levels 3-5.[12] The largest returns for NVQ 3-5 qualifications are observed in 1998 (5%), but in all other years except 2001 the returns are statistically insignificant. At levels 1 and 2, no NVQ/GNVQ qualifications receive positive, statistically significant returns in any year.[13]

Table 2 displays the returns to vocational qualifications for women. The table immediately makes clear that in none of the years studied is there a statistically significant return to apprenticeships for females. Women who have undertaken an apprenticeship training therefore earn no more, on average, than those who have not, holding other things constant, and there appears little to be gained in return for investing in an apprenticeship for women.

Considering the other vocational qualifications in Table 2, women earn the best returns on the BTEC qualifications, at HNC/HND level (7%-9%) and at ONC/OND level (5%-7%).[14] These returns are slightly lower than the equivalent male returns, discussed above. There also seem to be statistically significant returns to BTEC qualifications at the First Certificate/ Diploma in some years, peaking at 7% in 2002.

Few other vocational qualifications in Table 2 attract statistically significant positive returns for women.[15] In particular the craft based City and Guilds qualifications have no impact on female wages at any level in any year. Of the NVQ/GNVQ qualifications, those obtained at levels 3-5 do have a consistently positive and, with the exception of in 1996, statistically significant impact on wages. The size of the effect, around 3%-4%, is small,

[12] There are too few respondents holding NVQ qualifications at levels 4 and 5 to be treated as separate groups.

[13] In actual fact, the estimated returns to these qualifications are always negative. This is likely to be a consequence of unobserved characteristics biasing the coefficients, with the individuals who acquire such qualifications being of lower unobserved ability, and so earning less in the labour market for this reason. The coefficients should not be interpreted as implying that wages will actually fall following the acquisition of NVQ qualifications at levels 1 or 2. All that can be said here is that there is no evidence in favour of these qualifications having any positive impact on wages at all.

[14] There is apparently a 12% return to an ONC/OND qualification for women in 1996, although this seems to be out of line with the results in other years, and could be a statistical artefact.

[15] There is some evidence, not reported in Table 2, that higher level RSA qualifications, typically secretarial, have a positive return in some years for women. RSA qualifications were not reported in the tables, however, because they are not usually found in conjunction with apprenticeship.

however. As was found for men, lower level NVQ/GNVQ qualifications have no beneficial impact on wages for women.

3.2 The returns to apprenticeship by qualification obtained

As explained above, we do not strictly know which qualifications, if any, were obtained as a result of the completed apprenticeships observed in the data set. All we know is whether each individual holds an apprenticeship as well as each qualification of interest. This section therefore continues the analysis by examining whether there are additional returns to holding an apprenticeship and certain vocational qualifications, over and above the separate individual returns to each, as identified in Tables 1 and 2 above. This is done via a series of interaction terms between the apprenticeship variable and the qualification variables of interest.

Since, from this point on, we are now breaking down the apprenticeship returns according to certain characteristics, the cell sizes upon which such interaction coefficients are going to be based are necessarily going to be smaller. For this reason, it was decided to pool the data across the seven years available from 1996 to 2002. This seems reasonable, given that the results above suggested that the returns to the qualifications have been very stable over this period. This results in datasets of around 200,000 observations for men and 120,000 observations for women, so the resulting coefficients are well determined, even on the interaction terms.

The results are displayed in Table 3. The interpretation of the coefficient on the apprenticeship variable is now the return to an apprenticeship if none of the vocational qualifications in the table are held. The interpretation of the coefficients on these qualifications is now the returns to those qualifications, if an individual has not undergone an apprenticeship. The coefficients on the interaction terms are then the *additional* returns that an individual earns on average from holding both an apprenticeship and a particular qualification (perhaps obtained at the same time), over and above the sum of the returns that the individual could expect to receive holding the two in isolation. Thus the interaction coefficients tell us about the *additional* value of an apprenticeship if a certain qualification is obtained with it (or equivalently the additional value of each vocational qualification if it is obtained during an apprenticeship, of more accurately, by an apprentice, given the nature of our variables).

For example, the results in the male column indicate that the return to apprenticeship for men is 7% if they do not obtain any of the vocational qualifications listed during the apprenticeship (or strictly speaking if they do not hold any of these qualifications, no matter when they might have been acquired). The table also shows a 2% return to an Advanced Craft City and Guilds qualification, and a 3% returns to the Craft City and Guilds qualification, if they are not obtained together with an apprenticeship. The coefficients on the interaction terms between these variables are statistically insignificant, however, and are essentially zero. There is therefore no additional impact of obtaining City and Guilds qualifications through apprenticeship for men, over and above the sum of their separate returns.[16] Which qualifications do receive an extra return, if they are acquired with apprenticeship, then? The results show that the interaction term for HNC/HNDs is positive and statistically significant. Thus, the value of the apprenticeship is increased by 7% if an HND/ HNC is acquired. However, the HNC/HND is a level 4 qualification, and is therefore unlikely to have actually been obtained during the apprenticeship. Nevertheless, the result still shows that the return to an HNC/HND can be 7% higher if it is preceded by a trade apprenticeship[17]. At level 3 for BTEC qualifications, there is no additional gain from acquiring an OND/ONC qualification through apprenticeship, over and above the usal gain associated with this qualification.

The results for the NVQ/GNVQ qualifications are interesting, and are the key finding in this section. The results in Table 1 above suggested that, without allowing for interactions between apprenticeships and vocational qualifications, that the returns to these qualifications for men are statistically insignificant in most years at level 3 or above, and never achieve positive and statistically significant returns at levels below this. The results in Table 3 show that the returns to NVQ/GNVQ qualifications at levels 3-5 are zero for men if they are not acquired through apprenticeship. However, an individual who completes an apprenticeship and acquires an NVQ qualification at level 3[18] or above will earn 7% more, on average, then individuals with just a completed apprenticeship and no vocational qualifications, and 14% more than an individual without the apprenticeship or the NVQ qualification.[19] Thus we are

[16] It is true that the interactions coefficients for the lower level City and Guilds qualifications (Foundation level and 'don't know which level') are positive and statistically significant. However, the base coefficients for these two qualifications are both negative, meaning that the net effect if an apprentice were to acquire them during his apprenticeship would be essentially zero.

[17] It is the case that some apprenticeships in engineering can result in the award of an HNC/HND.

[18] With Advanced Modern Apprenticeships, there is an expectation that an NVQ level 3 qualification will be acquired.

[19] The 14% is equal to the sum of the coefficients on the NVQ3-5 and apprenticeship variables, plus the coefficient on their interaction.

seeing real value attached to apprenticeships for males when a level 3 qualification is acquired, approaching the 17% return to acquiring 2 or more A levels estimated in the same equation (not shown in Table 3).

For females, the results are much less encouraging, as far as apprenticeship is concerned. There is no wage gain at all following the completion of apprenticeship, and even the acquisition of the various vocational qualifications as an apprentice fail to raise a positive return to apprenticeship, with the exception of HNC/HND qualifications. Without a completed apprenticeship, these qualifications raise female wages by 8% on average. This return is then doubled if an apprenticeship is also completed. While this is obviously a good return, this would be expected, as the HNC/HND is a level 4 qualification, and in fact women can achieve similar returns to a nursing qualification and better returns to a teaching qualification at the same level (again not shown in Table 3).

From this point onwards, the analysis will focus only on males, given that no return to apprenticeship is being detected for women, and also because further decompositions of the returns to apprenticeships are going to be undertaken, and the small number of women who have completed apprenticeships gives cause for concern about cell sizes in the data.

3.3 The returns to apprenticeship for men aged under 30

So far, the analysis has calculated average returns to apprenticeships across the whole working population. However, this might not provide a very accurate prediction of future returns, needed if informed decisions are to be made, given that the nature of apprenticeships, and indeed the whole labour market, has changed so much in the recent past. Table 4 therefore repeats the analysis of Table 3, retaining the interaction terms between apprenticeships and vocational qualifications, for those men aged under 30 at the time they were surveyed by the LFS.

In actual fact, the results are not hugely different. The estimated return to an apprenticeship, with none of the listed vocational qualifications also being held, is 11%, which is somewhat above the 7% return for the full working population. Apprenticeship therefore remains, perhaps even increasingly so, a viable investment for young men. Looking at the returns to the various vocational qualifications, there is a difference in the City and Guilds returns, in that the level with the highest return is now the Advanced Craft level (with a return of 5%), rather than the Craft level (which has a return of zero for the under 30s). Perhaps young people today now require a level 3 qualification in order to establish

themselves in the labour market and receive some return on their investment in human capital, whereas for older workers the level 2 qualification was sufficient. Certainly, some researchers suggest that level 3 should be the minimum that young people should now be aiming for if they are to be successful in today's society (for example, West and Steedman, 2003). Further evidence of the importance of level 3 qualifications for young people is revealed by the statistically significant coefficient (suggesting a return of 5%) on the NVQ levels 3-5 variable, which contrasts with the zero effect observed for the whole population. As for BTEC, ONC/OND and HNC/HND qualifications receive significant returns for young men, as for the whole population. No vocational qualification below level 3 earns a positive and statistically significant return for young men.

Does apprenticeship increase the value of vocational qualifications, or equivalently is the value of apprenticeship raised by the acquisition of vocational qualifications, above and beyond the usual return attached to those qualifications? The results reveal that NVQ/GNVQ qualifications at level 3 or above are again important, as they were for the whole population. Such a qualification receives a 5% return on its own while an apprenticeship without qualifications receives an 11% return, as detailed above. Together, however, there is an additional 5% return, giving a total return to an apprenticeship/NVQ3 'package' of 21%. ONC/OND qualifications also receive an additional return above the usual, of 4%, if combined with apprenticeship.

3.4 The returns to apprenticeship by highest school qualification

This section allows the returns to apprenticeship to differ according to prior qualifications obtained. The aim is essentially to see whether the returns differ for individuals of varying ability, but in the absence of ability measures, the prior qualifications variable is used. In order to limit the permutations, only prior school qualifications are considered. Thus, we are investigating whether, for example, individuals who did not acquire qualifications at school benefit more from apprenticeship than those who did.

In the LFS sample for the years 1996-2002, a half of all those who have at some time in their lives completed an apprenticeship have no school qualifications at all. This is somewhat above the proportion of all people in the sample with no qualifications (40%). If the apprenticeship group do hold school level qualifications, then these are more likely to be at best GCSEs or equivalents rather than A levels. Dividing up the GCSE category, 5% of the apprenticeship group have at best GCSEs at grades D-F, 20% have up to 4 GCSEs at

grades A-C, and 16% have 5 or more GCSEs at grades A-C. The remaining 8% of the apprenticeship group have acquired at least 1 A level at school[20]. This latter figure contrasts with 22% in the full population, showing the low likelihood of those with A levels choosing to enter apprenticeship.

The returns to apprenticeships and vocational qualifications for men in these various school qualification groups are displayed in Table 5. The results reveal that the highest return to apprenticeship is earned by those men who did not acquire any qualifications at school. Thus men with no school qualifications who go on to complete an apprenticeship earn on average 13% more than similarly unqualified school leavers, holding any other qualification acquisition after school constant. The returns to apprenticeship for the other groups are 9% for both the GCSE grades D-F and the 1-4 GCSE grades A-C groups, and 4% for the 5+ GCSE grades A-C group. Thus it seems as though apprenticeship can be of particular value to previously low achievers at school in differentiating themselves from their peers and obtaining wage increases.

The pattern of returns for the other vocational qualifications are similar. Thus, the returns to, for example, HNC/HND and ONC/OND decline with higher school achievements. The craft-based City and Guilds qualifications are only of benefit to the low school-achievers, the returns to these qualifications for those with good GCSEs being statistically insignificant.

The pattern of results for the NVQ qualifications is of interest. For the qualification on its own, we observe the familiar pattern, with the returns to NVQ/GNVQ qualifications at level 3 or above being 8% for those who left school with no qualifications, 3% for those who left school with fewer than 5 good GCSEs, and zero for those who acquired 5 or more GCSEs at grades C or above. However, for these better performing men, an NVQ/GNVQ level 3-5 qualification acquired through an apprenticeship can be of real value. Thus, the value of such NVQ qualifications is raised by 12% through apprenticeship for those with only low grade GCSEs, by 6% for those with 1-4 GCSEs at grades A-C, and by 9% for those with 5 or more good GCSEs. Thus, we can see that for the first and third of these groups, the value of good NVQ qualifications goes from zero to substantial if it is acquired in conjunction with apprenticeship, while the value of the apprenticeship itself is also doubled or trebled. For example, consider the group who do well with their GCSEs, acquiring five or more at grade C or above. While an apprenticeship for this group would only raise their wages relative to their equivalent achievers at school by 4%, if they acquire an NVQ qualification at grade 3

[20] Because of these low numbers of A levels students going on to apprenticeship, these individuals are not considered in the remainder of this section.

(or above) with the apprenticeship, this wage gap rises to 13%. There is therefore real value to following this route for this group who have done well in their school examinations at age 16, but not proceeded to A level.

Finally in this section, we note that NVQ/GNVQ qualifications at levels 1 and 2 never earn a statistically significant positive return, whether acquired through apprenticeship or not, even for the group who left school with no qualifications. This result is perhaps surprising, and suggests that vocational qualifications below level 3 really do have little value in the modern labour market.

3.5 The returns to apprenticeship by industry

This section completes the analysis by presenting the returns to apprenticeship and the various vocational qualifications in a range of industries. The results are presented in Table 6 for manufacturing industries, Table 7 for sales and hospitality services, and Table 8 for other services.

Of the three categories of industry in the three tables, apprenticeship seems to have the highest returns in the manufacturing industries. In the seven such industries considered, the returns to apprenticeship are positive in each case, and statistically significant in 5 cases, the exceptions being the printing and chemical industries. In 3 of the 5 statistically significant cases, the returns to apprenticeship are greater than 10%, namely metal manufacture (17%), manufacture of machinery (13%) and construction (11%). In the service sector, however, Tables 7 and 8 reveal statistically significant returns to apprenticeship in only 1 of the 4 sales and hospitality industries (sale of motor vehicles, 11%) and in only 3 of the 7 other services (transportation, 9%, post and telecommunications, 10%, and public administration, 4%).

Turning to the formal vocational qualifications, the BTEC awards receive significant returns in most sectors. The craft-based City and Guilds qualifications are more likely to be rewarded, as might be expected, in the manufacturing industries. However, with the exception of the food manufacturing industry, there is no additional benefit to obtaining these qualifications through apprenticeship. Of all the service sector industries considered, only 1 (hotels and restaurants) pays significantly more to holders of City and Guilds qualifications, although there is no additional benefit to obtaining these through apprenticeship. These results are understandable given the importance attached in hospitality to Advanced Craft Level City and Guilds qualifications, which are required of chefs in many positions of note.

The returns to lower level City and Guilds qualifications could be due to the importance of basic hygiene training.

When considering the newer, NVQ/GNVQ qualifications, if anything the reverse is found when considering the returns by sector. In only 2 of the 7 manufacturing industries considered (chemicals and construction) is there a statistically significant return to NVQ/GNVQ level 3-5 qualifications, with there being an additional return in the construction industry if this qualification is acquired together with an apprenticeship. The construction sector is also the source of the only statistically significant return to an NVQ level 2 qualification in the whole paper, which, when taken in conjunction with an apprenticeship, boosts the returns to such apprenticeship by 12%. This can be rationalised, however, given that the construction industry sets its craft skills (such as bricklaying or plastering) at NVQ level 2, whereas in most other industries, such as in engineering, equivalent craft skills are placed at NVQ level 3. In the sales services, NVQ level 3-5 qualifications raise wages by at least 5% in each of the 4 industries considered, the effect being statistically significant in 2 cases; sale of motor vehicles (15%) and retail sales (6%). In the other services considered in Table 8, NVQ qualifications do not have a significant impact on their own, but in some cases do so in conjunction with a completed apprenticeship. In particular, there is a 29% additional return to the apprenticeship/NVQ level 3-5 combination in the auxiliary transport/travel agent industry, and a similar 7% return in the public administration industry, as well as an additional 12% return in the post/telecommunications industry that just fails to achieve statistical significance.

4 Conclusions

The results described in the previous section are heartening for apprenticeships, at least for males. They reveal returns to apprenticeship of around 7% for men. In other words, a man who has completed an apprenticeship can expect to earn on average 7% more than a man who has not, holding personal characteristics and other qualifications held constant. For women, however, there seems to be no gain in wages at all from completing an apprenticeship. This lack of return for women is certainly one area that requires urgent attention.

The analysis continues by examining whether there are any interaction effects, whereby the returns to an apprenticeship are increased if certain vocational qualifications are

held (over and above the usual return to those vocational qualifications). The key finding is that an NVQ qualification at level 3 or above seems to double the return to an apprenticeship, to around 14%. These returns compare quite favourably with returns of 17% to acquiring 2 or more A levels, which is the level 3 qualification on the academic side. Thus there are significant rewards on offer to individuals if they complete an apprenticeship and acquire a level 3 vocational qualification. These rewards presumably reflect the gain in value to firms, in terms of higher productivity, from employing such qualified men. This increased productivity can of course also be viewed as beneficial from society's point of view, as well as tackling well-documented skill shortages in the area of technical intermediate skills.

Looking at the interaction results from the point of view of NVQs rather than apprenticeship, the significant interaction coefficient is also very good news for these qualifications. There appear to be very low or even no returns at all to NVQ qualifications themselves, even at level 3, for men. However, when obtained together with a completed apprenticeship, they receive a 7% return. Embodying the NVQs in formal training structures such as apprenticeship therefore may be a way of making them more valued by the labour market, in contrast to the disappointing value that has been placed on such qualifications so far.

The subsequent analysis in the paper goes on to investigate these effects further, for particular subsets of the population, and always for men, since the returns for women are consistently zero. When the sample is restricted to young men, the results remain very similar, and so the effects identified above are not remnants of old-style apprenticeships from a bygone era. In particular, the importance of NVQ qualifications at level 3 or above for doubling the value of an apprenticeship remains.

When the sample is split according to prior qualifications obtained at school, then clear differences emerge between those who were successful at school and those who were not. Those men who left school with no qualifications earn good returns to apprenticeship, even when no qualifications are obtained. Similarly, an NVQ level 3 or above qualification yields high returns when obtained on its own. There is no additional gain from combining apprenticeship and NVQs for this group. However, as the level of success at school rises, so it becomes more important for this combination to be made. Those men who left school with 5 or more good GCSEs receive no returns to an NVQ level 3-5 qualification on its own, and only a 4% return to an apprenticeship without qualifications. However, acquiring an NVQ level 3-5 qualification through an apprenticeship increases earnings by 13%. Thus the importance of acquiring a level 3 qualification whilst on an apprenticeship, as described

above, is particularly relevant to those who have left school with good qualifications, in order to stand out amongst their peers.

Finally, the split in the sample by industry reveals that apprenticeships without qualifications have more value in manufacturing than in service industries. Formal qualifications as part of an apprenticeship appear to be more important in service sector industries. In particular, an NVQ level 3-5 effect is observed boosting the returns to apprenticeship in the travel agent, post office/telecommunications and public administration industries, as well as, away from services, in the construction industry.

In conclusion therefore, this paper reveals healthy returns to apprenticeship that need to be advertised amongst potential recruits to apprenticeship programmes. The results also make clear, however, the importance of acquiring qualifications, particularly an NVQ level 3 or above qualification, through the apprenticeship, if the full gain in earnings (and hence productivity) is to be realised. This is particularly important for those who have already acquired good GCSEs at school (who make up much of the market for Modern Apprenticeship). At present, the LFS data set used here suggests that around one quarter (26%) of recent[21] male apprentices have acquired an NVQ level 3-5 qualification as well as completing an apprenticeship. While this is naturally substantially higher than the proportion of all young men who acquire NVQ level 3-5 qualifications (6%), it still means that many apprentices are not reaching this level. When we consider all vocational qualifications, 46% of recent male apprentices have a vocational qualification at level 3 or above. The above results suggest it would be beneficial to the country, as well as to firms and the apprentices themselves, if a much higher proportion of apprentices were reaching this level.

[21] This figure is for the under-25s in the data set, to ensure that only recent apprentices are being considered.

Table 1 Returns to Apprenticeships by Year: Males

	1996	1997	1998	1999	2000	2001	2002
City and Guilds Advanced Craft	0.017	**0.047**	**0.041**	**0.023**	0.013	0.018	0.007
	(0.014)	**(0.009)****	**(0.009)****	**(0.009)***	(0.009)	(0.009)	(0.010)
City and Guilds Craft	-0.011	0.023	**0.067**	**0.061**	**0.069**	**0.057**	**0.060**
	(0.016)	(0.013)	**(0.014)****	**(0.015)****	**(0.016)****	**(0.016)****	**(0.016)****
City and Guilds Foundation	0.021	-0.011	-0.050	-0.047	-0.047	-0.049	-0.052
	(0.014)	(0.012)	(0.012)**	(0.013)**	(0.015)**	(0.014)**	(0.014)**
City and Guilds 'Don't know'	-0.023	0.001	0.003	0.010	0.003	-0.017	0.009
	(0.020)	(0.012)	(0.011)	(0.012)	(0.012)	(0.013)	(0.012)
HNC/HND	**0.119**	**0.114**	**0.135**	**0.133**	**0.114**	**0.116**	**0.122**
	(0.014)**	**(0.009)****	**(0.009)****	**(0.009)****	**(0.009)****	**(0.009)****	**(0.010)****
ONC/OND	**0.099**	**0.101**	**0.076**	**0.075**	**0.099**	**0.087**	**0.066**
	(0.013)**	**(0.009)****	**(0.010)****	**(0.009)****	**(0.010)****	**(0.010)****	**(0.010)****
BTEC Diploma/certificate	**0.079**	**0.048**	0.023	0.026	**0.053**	0.033	**0.045**
	(0.026)**	**(0.023)***	(0.021)	(0.022)	**(0.023)***	(0.024)	**(0.023)***
NVQ 3-5	0.022	0.007	**0.050**	0.021	0.014	**0.021**	0.014
	(0.027)	(0.014)	**(0.014)****	(0.013)	(0.011)	**(0.011)***	(0.011)
NVQ 2	-0.065	-0.083	-0.060	-0.055	-0.085	-0.088	-0.092
	(0.022)**	(0.014)**	(0.014)**	(0.012)**	(0.013)**	(0.012)**	(0.012)**
NVQ 1	-0.126	-0.101	-0.102	-0.135	-0.075	-0.068	-0.068
	(0.040)**	(0.024)**	(0.024)**	(0.022)**	(0.019)**	(0.019)**	(0.020)**
Other	**0.037**	**0.045**	**0.046**	**0.041**	**0.050**	**0.054**	**0.045**
	(0.070)**	**(0.005)****	**(0.005)****	**(0.005)****	**(0.050)****	**(0.005)****	**(0.005)****
Apprenticeship	**0.067**	**0.052**	**0.059**	**0.062**	**0.064**	**0.067**	**0.070**
	(0.009)**	**(0.006)****	**(0.006)****	**(0.006)****	**(0.007)****	**(0.007)****	**(0.007)****
Observations	16476	32476	32293	30483	28733	28295	27543
R squared	0.41	0.42	0.43	0.42	0.41	0.41	0.41

The estimated equations also control for all other qualifications held, age, ethnicity, region, workplace size and public/private sector.

Robust standard errors in parentheses.

* significant at 5%; ** significant at 1%. Positive and statistically significant returns are shown in bold for easy identification.

Data: Labour Force Survey.

Table 2 Returns to Apprenticeships by Year: Females

	1996	1997	1998	1999	2000	2001	2002
City and Guilds Advanced Craft	-0.072	-0.010	-0.017	-0.021	-0.057	-0.031	-0.016
	(0.038)	(0.025)	(0.027)	(0.027)	(0.031)	(0.026)	(0.024)
City and Guilds Craft	0.040	-0.010	-0.020	0.047	0.034	0.047	0.048
	(0.036)	(0.024)	(0.026)	(0.027)	(0.030)	(0.028)	(0.026)
City and Guilds Foundation	-0.070	-0.040	-0.052	-0.050	-0.079	-0.080	-0.080
	(0.018)**	(0.016)*	(0.018)**	(0.018)**	(0.020)**	(0.020)**	(0.020)**
City and Guilds 'Don't know'	-0.059	-0.003	0.003	-0.015	-0.046	-0.040	0.036
	(0.033)	(0.021)	(0.021)	(0.019)	(0.018)*	(0.020)*	(0.020)
HNC/HND	**0.063**	**0.076**	**0.081**	**0.080**	**0.082**	**0.087**	**0.064**
	(0.019)**	**(0.014)****	**(0.013)****	**(0.014)****	**(0.014)****	**(0.014)****	**(0.014)****
ONC/OND	**0.110**	**0.063**	**0.052**	**0.045**	**0.063**	**0.052**	**0.053**
	(0.021)**	**(0.014)****	**(0.014)****	**(0.013)****	**(0.014)****	**(0.014)****	**(0.013)****
BTEC Diploma/certificate	**0.060**	**0.036**	0.021	**0.056**	0.018	0.016	**0.071**
	(0.030)*	**(0.018)***	(0.020)	**(0.021)****	(0.028)	(0.024)	**(0.028)***
NVQ 3-5	0.010	**0.033**	**0.032**	**0.033**	**0.027**	**0.042**	**0.025**
	(0.027)	**(0.014)***	**(0.013)***	**(0.012)****	**(0.012)***	**(0.011)****	**(0.010)***
NVQ 2	-0.086	-0.066	-0.080	-0.073	-0.076	-0.063	-0.066
	(0.020)**	(0.014)**	(0.012)**	(0.012)**	(0.011)**	(0.010)**	(0.011)**
NVQ 1	-0.061	-0.094	-0.092	-0.114	-0.095	-0.086	-0.060
	(0.044)	(0.024)**	(0.023)**	(0.020)**	(0.021)**	(0.022)**	(0.021)**
Other	**0.034**	**0.062**	**0.063**	**0.062**	**0.067**	**0.064**	0.065
	(0.009)**	**(0.006)****	**(0.006)****	**(0.006)****	**(0.006)****	**(0.006)****	(0.006)**
Apprenticeship	0.027	-0.010	-0.017	-0.012	-0.002	-0.020	-0.032
	(0.016)	(0.012)	(0.012)	(0.013)	(0.013)	(0.013)	(0.014)*
Observations	9827	19792	19789	18888	17738	17965	17773
R squared	0.43	0.45	0.44	0.43	0.43	0.42	0.42

See notes for Table 1.

Table 3 Returns to Apprenticeship by Qualification Obtained 1996-2002

	Males	Females
City and Guilds Advanced Craft	**0.022**	-0.027
	(0.009)*	(0.013)*
City and Guilds Craft	**0.033**	**0.025**
	(0.009)**	**(0.012)***
City and Guilds Foundation	-0.046	-0.068
	(0.006)**	(0.008)**
City and Guilds 'Don't Know'	-0.005	-0.003
	(0.007)	(0.009)
HNC/HND	**0.095**	**0.074**
	(0.005)**	**(0.006)****
ONC/OND	**0.084**	**0.062**
	(0.005)**	**(0.006)****
BTEC Diploma/certificate	**0.033**	**0.029**
	(0.010)**	**(0.009)****
NVQ 3-5	0.004	**0.046**
	(0.006)	**(0.005)****
NVQ 2	-0.071	-0.059
	(0.006)**	(0.005)**
NVQ 1	-0.084	-0.081
	(0.009)**	(0.009)**
Other	**0.060**	**0.063**
	(0.002)**	**(0.002)****
Apprenticeship	**0.067**	-0.003
	(0.004)**	(0.008)
Apprenticeship + C&G Advanced Craft	0.010	0.006
	(0.010)	(0.023)
Apprenticeship + C&G Craft	0.007	-0.010
	(0.012)	(0.026)
Apprenticeship + C&G Foundation	**0.036**	0.021
	(0.010)**	(0.020)
Apprenticeship + C&G 'Don't Know'	**0.023**	-0.091
	(0.010)*	(0.020)**
Apprenticeship + HNC/HND	**0.069**	**0.081**
	(0.007)**	**(0.024)****
Apprenticeship + ONC/OND	-0.002	-0.019
	(0.008)	(0.025)
Apprenticeship + BTEC Diploma/certificate	0.019	0.009
	(0.020)	(0.048)
Apprenticeship + NVQ 3-5	**0.071**	-0.017
	(0.010)**	(0.016)
Apprenticeship + NVQ 2	0.014	-0.008
	(0.012)	(0.018)
Apprenticeship + NVQ 1	0.008	0.003
	(0.021)	(0.036)
Apprenticeship + Other	-0.052	-0.020
	(0.004)**	(0.010)*
Observations	196299	121772
R Squared	0.42	0.43

See notes for Table 1.

Table 4 Returns to Apprenticeship by Qualification Obtained for the Under-30s, Males, 1996-2002

Qualification	Return
City and Guilds Advanced Craft	**0.051**
	(0.016)**
City and Guilds Craft	0.008
	(0.014)
City and Guilds Foundation	-0.037
	(0.010)**
City and Guilds 'Don't Know'	-0.026
	(0.013)*
HNC/HND	**0.071**
	(0.008)**
ONC/OND	**0.061**
	(0.008)**
BTEC Diploma/certificate	0.007
	(0.013)
NVQ 3-5	**0.048**
	(0.008)**
NVQ 2	-0.002
	(0.007)
NVQ 1	-0.033
	(0.012)**
Other	**0.040**
	(0.004)**
Apprenticeship	**0.104**
	(0.010)**
Apprenticeship + C&G Advanced Craft	-0.035
	(0.019)
Apprenticeship + C&G Craft	0.022
	(0.024)
Apprenticeship + C&G Foundation	0.002
	(0.021)
Apprenticeship + C&G 'Don't Know'	**0.040**
	(0.020)*
Apprenticeship + HNC/HND	0.019
	(0.016)
Apprenticeship + ONC/OND	**0.035**
	(0.015)*
Apprenticeship + BTEC Diploma/certificate	0.052
	(0.033)
Apprenticeship + NVQ 3-5	**0.051**
	(0.013)**
Apprenticeship + NVQ 2	-0.029
	(0.016)
Apprenticeship + NVQ 1	0.007
	(0.032)
Apprenticeship + Other	-0.045
	(0.009)**
Observations	43990
R Squared	0.46

See notes for Table 1.

Table 5 Returns to Apprenticeship by Qualification Obtained and Highest School Qualification, Males, 1996-2002

	None	GCSE D-F	1-4 GCSE C-A*	5+ GCSE C-A*
City and Guilds Advanced Craft	**0.068**	0.045	0.027	-0.047
	(0.019)**	(0.027)	(0.015)	(0.018)**
City and Guilds Craft	**0.042**	**0.053**	0.001	-0.016
	(0.016)*	**(0.021)***	(0.016)	(0.022)
City and Guilds Foundation	-0.015	-0.002	-0.028	-0.088
	(0.012)	(0.016)	(0.012)*	(0.015)**
City and Guilds 'Don't Know'	**0.055**	0.015	0.011	-0.060
	(0.013)**	(0.020)	(0.014)	(0.018)**
HNC/HND	**0.231**	**0.167**	**0.167**	**0.114**
	(0.020)**	**(0.035)****	**(0.012)****	**(0.008)****
ONC/OND	**0.140**	**0.149**	**0.138**	**0.073**
	(0.022)**	**(0.025)****	**(0.010)****	**(0.008)****
BTEC Diploma/certificate	0.026	0.060	**0.050**	0.020
	(0.035)	(0.032)	**(0.017)****	(0.018)
NVQ 3-5	**0.075**	0.015	**0.027**	-0.002
	(0.015)**	(0.022)	**(0.012)***	(0.012)
NVQ 2	-0.069	-0.010	-0.046	-0.092
	(0.011)**	(0.014)	(0.010)**	(0.013)**
NVQ 1	-0.067	-0.061	-0.086	-0.150
	(0.016)**	(0.021)**	(0.017)**	(0.025)**
Other	**0.091**	0.009	**0.021**	**0.035**
	(0.004)**	(0.008)	**(0.006)****	**(0.006)****
Apprenticeship	**0.121**	**0.090**	**0.083**	**0.043**
	(0.006)**	**(0.017)****	**(0.009)****	**(0.010)****
Apprenticeship + C&G Advanced Craft	-0.025	-0.024	-0.001	0.012
	(0.021)	(0.031)	(0.017)	(0.021)
Apprenticeship + C&G Craft	-0.004	0.037	0.027	-0.033
	(0.021)	(0.031)	(0.022)	(0.031)
Apprenticeship + C&G Foundation	0.023	-0.042	-0.005	**0.063**
	(0.017)	(0.028)	(0.020)	**(0.026)***
Apprenticeship + C&G 'Don't Know'	-0.004	0.011	-0.018	0.004
	(0.015)	(0.030)	(0.019)	(0.024)
Apprenticeship + HNC/HND	0.008	0.018	0.022	**0.042**
	(0.024)	(0.045)	(0.015)	**(0.012)****
Apprenticeship + ONC/OND	-0.014	0.008	-0.037	-0.011
	(0.026)	(0.037)	(0.014)**	(0.012)
Apprenticeship + BTEC Diploma/certificate	-0.008	0.108	0.033	0.021
	(0.048)	(0.066)	(0.029)	(0.040)
Apprenticeship + NVQ 3-5	-0.002	**0.113**	**0.054**	**0.083**
	(0.022)	**(0.032)****	**(0.017)****	**(0.018)****
Apprenticeship + NVQ 2	-0.002	-0.018	0.028	0.001
	(0.023)	(0.032)	(0.021)	(0.025)
Apprenticeship + NVQ 1	-0.027	0.007	0.043	0.043
	(0.037)	(0.048)	(0.038)	(0.053)
Apprenticeship + Other	-0.066	-0.017	-0.038	-0.042
	(0.007)**	(0.014)	(0.009)**	(0.010)**
Observations	66507	11610	35411	31846
R Squared	0.22	0.37	0.35	0.39

See notes for Table 1.

Table 6 Returns to Apprenticeship by Qualification Obtained and Industry, Manufacturing, Males, 1996-2002

	food	printing	chemical	metals	machines	vehicles	construct
City and Guilds Advanced Craft	-0.057	0.088	**0.105**	0.095	0.021	-0.014	**0.082**
	(0.053)	(0.068)	**(0.042)***	(0.049)	(0.037)	(0.039)	**(0.031)****
City and Guilds Craft	**0.118**	0.019	0.009	-0.003	0.075	-0.034	**0.064**
	(0.053)*	(0.083)	(0.065)	(0.043)	(0.040)	(0.043)	**(0.027)***
City and Guilds Foundation	-0.090	-0.036	0.046	0.030	-0.009	0.056	-0.012
	(0.038)*	(0.065)	(0.053)	(0.036)	(0.035)	(0.034)	(0.019)
City and Guilds 'Don't Know'	-0.004	-0.074	**0.100**	0.001	-0.012	-0.017	**0.083**
	(0.035)	(0.064)	**(0.049)***	(0.047)	(0.033)	(0.041)	**(0.019)****
HNC/HND	**0.146**	0.066	0.030	**0.115**	**0.225**	**0.177**	**0.184**
	(0.037)**	(0.037)	(0.024)	**(0.034)****	**(0.025)****	**(0.037)****	**(0.015)****
ONC/OND	**0.141**	-0.002	**0.077**	**0.116**	**0.112**	**0.070**	**0.082**
	(0.034)**	(0.038)	**(0.028)****	**(0.036)****	**(0.025)****	**(0.035)***	**(0.016)****
BTEC Diploma/certificate	-0.061	**0.138**	**0.143**	-0.028	0.078	0.071	-0.016
	(0.060)	**(0.057)***	**(0.058)***	(0.059)	(0.049)	(0.053)	(0.046)
NVQ 3-5	0.029	0.028	**0.134**	0.039	-0.025	-0.006	**0.068**
	(0.042)	(0.053)	**(0.043)****	(0.048)	(0.037)	(0.040)	**(0.028)***
NVQ 2	-0.002	0.004	0.069	-0.073	-0.053	-0.063	-0.040
	(0.028)	(0.053)	(0.043)	(0.028)**	(0.031)	(0.030)*	(0.020)*
NVQ 1	-0.037	-0.114	-0.014	-0.185	-0.084	-0.066	-0.049
	(0.045)	(0.063)	(0.052)	(0.044)**	(0.059)	(0.036)	(0.032)
Other	**0.054**	0.029	**0.042**	**0.051**	**0.049**	0.023	**0.081**
	(0.013)**	(0.022)	**(0.015)****	**(0.014)****	**(0.013)****	(0.014)	**(0.008)****
Apprenticeship	**0.060**	0.038	0.021	**0.159**	**0.120**	**0.075**	**0.106**
	(0.025)*	(0.025)	(0.028)	**(0.019)****	**(0.018)****	**(0.020)****	**(0.011)****
Apprenticeship + C&G Advanced Craft	**0.163**	-0.009	-0.008	-0.078	0.031	0.042	-0.059
	(0.060)**	(0.072)	(0.050)	(0.052)	(0.040)	(0.043)	(0.032)
Apprenticeship + C&G Craft	-0.093	-0.013	-0.039	0.017	-0.042	0.075	-0.006
	(0.071)	(0.098)	(0.080)	(0.058)	(0.049)	(0.056)	(0.034)
Apprenticeship + C&G Foundation	**0.139**	0.077	0.034	-0.035	-0.028	-0.097	-0.028
	(0.057)*	(0.082)	(0.069)	(0.052)	(0.044)	(0.047)*	(0.027)
Apprenticeship + C&G 'Don't Know'	0.101	0.131	-0.029	0.006	0.011	0.044	-0.059
	(0.054)	(0.073)	(0.064)	(0.053)	(0.043)	(0.054)	(0.025)*
Apprenticeship + HNC/HND	0.004	-0.039	**0.142**	0.029	-0.030	0.009	-0.048
	(0.052)	(0.062)	**(0.039)****	(0.044)	(0.032)	(0.043)	(0.021)*
Apprenticeship + ONC/OND	0.028	0.113	-0.012	-0.039	-0.047	0.032	-0.011
	(0.053)	(0.060)	(0.042)	(0.044)	(0.031)	(0.043)	(0.022)
Apprenticeship + BTEC Diploma/certificate	0.209	-0.203	-0.036	0.044	-0.042	-0.058	0.023
	(0.111)	(0.275)	(0.081)	(0.085)	(0.069)	(0.070)	(0.061)
Apprenticeship + NVQ 3-5	0.072	0.119	-0.017	0.035	0.049	-0.020	**0.110**
	(0.057)	(0.093)	(0.056)	(0.058)	(0.046)	(0.050)	**(0.033)****
Apprenticeship + NVQ 2	0.041	-0.007	-0.144	0.070	-0.043	-0.004	**0.115**
	(0.060)	(0.103)	(0.064)*	(0.056)	(0.056)	(0.066)	**(0.030)****
Apprenticeship + NVQ 1	-0.053	0.199	-0.218	0.059	-0.059	-0.140	0.064
	(0.086)	(0.144)	(0.094)*	(0.074)	(0.112)	(0.116)	(0.051)
Apprenticeship + Other	-0.055	0.012	-0.028	-0.073	-0.058	-0.039	-0.053
	(0.026)*	(0.030)	(0.027)	(0.021)**	(0.018)**	(0.021)	(0.011)**
Observations	5326	3741	3837	5328	6327	4497	17200
R Squared	0.39	0.35	0.46	0.39	0.39	0.39	0.45

See notes for Table 1.

Table 7 Returns to Apprenticeship by Qualification Obtained and Industry, Sales Services, Males, 1996-2002

	Vehicles	wholesale	Retail	Hotels/restaurants
City and Guilds Advanced Craft	0.057	0.013	0.004	**0.079**
	(0.039)	(0.059)	(0.040)	**(0.034)***
City and Guilds Craft	0.057	0.002	0.016	**0.088**
	(0.044)	(0.041)	(0.036)	**(0.043)***
City and Guilds Foundation	0.004	-0.038	-0.041	-0.035
	(0.032)	(0.030)	(0.027)	(0.037)
City and Guilds 'Don't Know'	**0.083**	0.015	-0.011	0.041
	(0.035)*	(0.033)	(0.029)	(0.044)
HNC/HND	0.084	**0.077**	**0.102**	**0.146**
	(0.045)	**(0.030)****	**(0.024)****	**(0.035)****
ONC/OND	**0.140**	**0.079**	**0.085**	0.070
	(0.032)**	**(0.032)***	**(0.021)****	(0.037)
BTEC Diploma/certificate	-0.131	0.021	-0.012	0.027
	(0.065)*	(0.042)	(0.035)	(0.043)
NVQ 3-5	**0.136**	0.077	**0.060**	0.042
	(0.042)**	(0.040)	**(0.019)****	(0.029)
NVQ 2	0.024	-0.060	-0.026	0.021
	(0.032)	(0.027)*	(0.018)	(0.022)
NVQ 1	-0.148	-0.038	-0.089	-0.041
	(0.044)**	(0.044)	(0.027)**	(0.041)
Other	**0.073**	-0.011	**0.046**	**0.082**
	(0.016)**	(0.012)	**(0.010)****	**(0.014)****
Apprenticeship	**0.100**	0.042	0.031	0.058
	(0.020)**	(0.025)	(0.021)	(0.037)
Apprenticeship + C&G Advanced Craft	-0.036	0.048	0.028	-0.072
	(0.041)	(0.066)	(0.048)	(0.047)
Apprenticeship + C&G Craft	-0.069	-0.055	-0.025	-0.111
	(0.052)	(0.067)	(0.059)	(0.082)
Apprenticeship + C&G Foundation	0.009	0.101	0.069	0.051
	(0.041)	(0.059)	(0.051)	(0.078)
Apprenticeship + C&G 'Don't Know'	-0.080	0.046	-0.023	0.064
	(0.042)	(0.051)	(0.042)	(0.069)
Apprenticeship + HNC/HND	0.047	**0.173**	0.033	-0.065
	(0.058)	**(0.046)****	(0.053)	(0.080)
Apprenticeship + ONC/OND	-0.031	-0.030	0.003	-0.008
	(0.047)	(0.051)	(0.054)	(0.072)
Apprenticeship + BTEC Diploma/certificate	**0.305**	-0.123	-0.073	0.116
	(0.121)*	(0.102)	(0.094)	(0.104)
Apprenticeship + NVQ 3-5	-0.024	-0.057	0.027	0.103
	(0.048)	(0.065)	(0.054)	(0.055)
Apprenticeship + NVQ 2	-0.046	-0.013	-0.058	-0.125
	(0.052)	(0.066)	(0.051)	(0.046)**
Apprenticeship + NVQ 1	**0.200**	-0.054	-0.002	0.179
	(0.061)**	(0.058)	(0.086)	(0.221)
Apprenticeship + Other	-0.066	-0.022	-0.060	-0.002
	(0.021)**	(0.026)	(0.022)**	(0.034)
Observations	5442	7587	10166	3947
R Squared	0.43	0.37	0.38	0.32

See notes for Table 1.

Table 8 Returns to Apprenticeship by Qualification Obtained and Industry, Other Services, Males, 1996-2002

	transport	Tr.agents	post	estate	Public	health	sport
City and Guilds Advanced Craft	0.026	-0.053	0.067	0.077	0.010	-0.073	0.069
	(0.049)	(0.056)	(0.044)	(0.113)	(0.021)	(0.042)	(0.053)
City and Guilds Craft	0.037	0.026	-0.011	0.194	0.044	0.113	0.112
	(0.047)	(0.052)	(0.037)	(0.112)	(0.026)	(0.041)**	(0.052)*
City and Guilds Foundation	0.011	-0.038	0.026	-0.239	-0.048	-0.115	-0.170
	(0.034)	(0.037)	(0.026)	(0.093)**	(0.019)*	(0.032)**	(0.034)**
City and Guilds 'Don't Know'	0.027	-0.011	0.025	-0.088	-0.009	0.077	-0.111
	(0.036)	(0.041)	(0.034)	(0.133)	(0.020)	(0.033)*	(0.051)*
HNC/HND	**0.110**	**0.131**	**0.143**	**0.068**	0.012	0.018	0.056
	(0.043)*	**(0.039)****	**(0.028)****	**(0.032)***	(0.011)	(0.024)	(0.035)
ONC/OND	**0.134**	0.050	**0.091**	0.068	**0.029**	**0.091**	-0.013
	(0.042)**	(0.033)	**(0.024)****	(0.038)	**(0.012)***	**(0.024)****	(0.043)
BTEC Diploma/certificate	-0.118	-0.006	**0.114**	0.042	-0.012	**0.130**	0.012
	(0.101)	(0.061)	**(0.042)****	(0.084)	(0.030)	**(0.046)****	(0.085)
NVQ 3-5	-0.026	-0.037	-0.006	0.024	-0.034	0.034	-0.110
	(0.041)	(0.036)	(0.036)	(0.086)	(0.016)*	(0.022)	(0.036)**
NVQ 2	0.014	-0.016	-0.084	-0.171	-0.108	-0.173	-0.052
	(0.034)	(0.030)	(0.030)**	(0.063)**	(0.019)**	(0.027)**	(0.037)
NVQ 1	-0.086	-0.015	0.033	0.076	-0.092	-0.155	-0.079
	(0.039)*	(0.052)	(0.044)	(0.236)	(0.035)**	(0.053)**	(0.062)
Other	-0.019	**0.069**	**0.074**	**0.075**	**0.099**	**0.106**	**0.043**
	(0.013)	**(0.013)****	**(0.012)****	**(0.023)****	**(0.006)****	**(0.010)****	**(0.017)***
Apprenticeship	**0.089**	0.014	**0.095**	0.029	**0.039**	-0.018	0.070
	(0.024)**	(0.031)	**(0.021)****	(0.045)	**(0.013)****	(0.022)	(0.042)
Apprenticeship + C&G Advanced Craft	0.019	0.048	-0.017	-0.043	-0.001	0.086	-0.058
	(0.055)	(0.064)	(0.050)	(0.123)	(0.025)	(0.048)	(0.070)
Apprenticeship + C&G Craft	-0.048	0.020	0.000	-0.004	-0.000	-0.061	-0.066
	(0.071)	(0.077)	(0.052)	(0.150)	(0.037)	(0.056)	(0.096)
Apprenticeship + C&G Foundation	-0.004	-0.009	-0.028	0.125	0.028	0.093	0.091
	(0.062)	(0.065)	(0.044)	(0.138)	(0.030)	(0.048)	(0.086)
Apprenticeship + C&G 'Don't Know'	-0.006	0.003	-0.090	0.028	0.025	-0.003	0.030
	(0.048)	(0.064)	(0.047)	(0.154)	(0.029)	(0.049)	(0.082)
Apprenticeship + HNC/HND	0.075	-0.003	**0.083**	0.076	**0.094**	**0.179**	0.020
	(0.069)	(0.061)	**(0.040)***	(0.058)	**(0.019)****	**(0.041)****	(0.073)
Apprenticeship + ONC/OND	0.006	0.107	0.008	0.062	0.027	0.013	0.144
	(0.062)	(0.058)	(0.039)	(0.069)	(0.019)	(0.045)	(0.096)
Apprenticeship + BTEC Diploma/certificate	0.118	0.218	-0.001	-0.089	0.022	-0.058	0.114
	(0.144)	(0.116)	(0.087)	(0.121)	(0.066)	(0.106)	(0.236)
Apprenticeship + NVQ 3-5	0.007	**0.258**	0.113	-0.049	**0.065**	0.027	0.021
	(0.066)	**(0.073)****	(0.061)	(0.120)	**(0.028)***	(0.046)	(0.086)
Apprenticeship + NVQ 2	-0.051	-0.199	-0.038	0.186	-0.022	0.035	-0.074
	(0.061)	(0.081)*	(0.058)	(0.120)	(0.041)	(0.060)	(0.075)
Apprenticeship + NVQ 1	**0.230**	0.250	-0.056	-0.101	-0.042	0.102	-0.015
	(0.097)*	(0.186)	(0.094)	(0.265)	(0.075)	(0.086)	(0.340)
Apprenticeship + Other	-0.043	0.029	-0.058	-0.127	-0.069	-0.059	-0.032
	(0.025)	(0.031)	(0.022)**	(0.047)**	(0.013)**	(0.022)**	(0.043)
Observations	6525	5301	6488	2081	16144	8046	3902
R Squared	0.26	0.38	0.39	0.41	0.37	0.45	0.38

See notes for Table 1.

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