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Variation in the Labour Market Rewards to Vocational Qualifications in the UK

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Abstract: We use UK Labour Force Survey data to estimate wage differentials associated with the attainment of vocational qualifications, relative to comparison groups qualified to at best one level below. Our main aim is to show the variation in the size of such differentials, according to the unobserved characteristics of the individual, via quantile regression, and also according to the characteristics of the qualifications themselves, in terms of the level, type and subject area. With respect to subject area, the key reason for variation in differentials across subjects is the differences in occupations to which qualifications lead.

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1. Introduction

A huge variety of vocational qualifications exist in the UK. The Wolf Report (Wolf, 2011), into vocational education for 14-19 year olds suggested that there are around 13,000 different vocational qualifications in the UK, once we take into account different awarding bodies, levels and subject areas. There is therefore no reason to expect a single answer to the question 'what is the labour market value of a vocational qualification in the UK', and rather, a great amount of variation should be expected. This paper is an attempt to shed some light on this variation, looking in particular at the subject area of qualifications, which has received little attention in the literature.

Education in England differs from that in many other developed countries by having separate qualifications by subject to be taken at the end of compulsory full-time education at the age 16: the General Certificates of Secondary Education (GCSEs). Following these examinations, young people must, since 2015, continue to receive some form of education until the age of 18[1], either by remaining in full-time education, undertaking an apprenticeship or traineeship, or working in a job whilst studying part-time.

In order to help individuals make such decisions about which route and which qualifications to take, it is important for them to have information on the economic value placed on those qualifications by the labour market. This paper provides such information, by estimating wage differentials between a treatment group with a particular qualification, and a control group without that qualification. Of most interest to individuals is the change in their wages if they reach a new highest education level via acquiring a new qualification, and so the control groups we consider are made up of individuals one level below the qualification being considered, to provide an estimate of the wages that would be received had the individual not acquired that qualification.

[1] This is not a requirement in the other countries of the UK, where individuals can still completely leave education and training at age 16.

The 'returns to education' literature is one of the largest in the applied economics field. Extensive work has been undertaken looking at how earnings vary on average with an additional year of education, with much work focussing on methodological approaches to obtaining unbiased estimates of the coefficients on education variables.[2] In parallel with this literature looking at the effect of a single variable, years of education, another has developed looking at the wage differentials associated with a range of qualifications, represented by a series of dummy variables in the wage equation. This approach is perhaps most associated with the UK, which has a large number of qualifications available, particularly on the vocational side, and a non-linear system where individuals do not progress at a constant rate each year, again particularly on the vocational side. In such a system, it makes less sense to derive a single estimate of the wage gain associated with one additional year of education.

The most frequently used data set in research on wage differentials associated with UK qualifications is the Labour Force Survey (LFS), due its detailed information on all qualifications held by individuals, wide-ranging labour market information, and large sample sizes allowing disaggregation by individual qualifications. Examples of studies to have used such data for detailed analysis of vocational qualifications are Dearden *et al.* (2002), Dearden *et al.* (2004), Dickerson and Vignoles (2007), Jenkins *et al.* (2007) and McIntosh (2006), with McIntosh (2010) providing an overview of this body of work. These papers have consistently found similar findings. For vocational qualifications at L[3]evel 3, wage

[2] For a review, see for example Card (1999) or Harmon and Oosterbeek (2000).

[3] BTEC (Business and Technology Education Council) qualifications are in most cases taken by full-time students in colleges of Further Education, most often in the areas of business and technology, as suggested by their name). A full Level 3 qualification would typically involve two years of study. NVQs (National Vocational Qualifications) are typically work-based qualifications, in which the learner has to demonstrate competence in the particular field, acquired through on-the-job training, day-release study at a college, and/or simply learning through experience. They are available in a

differentials are observed between individuals who do and do not hold the qualifications of around 10% on average, with some variation around this figure by type of qualification (for example somewhat higher for BTEC qualifications and somewhat lower for NVQ qualifications). Such figures are, however, a little lower than the typical differentials earned by academic qualifications at the same level.

At Level 2, the wage differentials associated with vocational qualifications are much smaller than those at Level 3. For most qualifications they are statistically insignificantly different from zero, and in some cases, for example NVQs, the wage differential between those with and without the qualification has been observed as negative and statistically significant. Dearden *et al.* (2004) further investigate the latter result, and adjust the control group against whom the differentials are measured, from all those without the NVQ2 qualification, to a carefully selected control group, namely individuals with either no qualifications at all, or at best very low (Level 1) qualifications. This group are chosen to better reflect 'the sort of people who would choose to do an NVQ2'. Even in this case, no statistically significant positive wage differentials are observed for males, while for females a significant, though small, 3% differential is observed, when NVQ2 holders were compared to individuals with no qualifications at all. The use of a particular and appropriate comparison group when considering vocational qualifications is a methodology that will also be followed in this paper.

More recent research has begun using alternative data sources to investigate the same issues, in particular using administrative data rather than data based on sample surveys. Administrative data sets have the advantages of large sample sizes as well as detailed information about type of qualifications attained. Disadvantages include the limited availability of individual characteristics with

wide range of areas, most frequently in service areas, though also in manual areas such as engineering and construction.

which to control for other factors associated with earnings, and the fact that data are typically available only for recent cohorts of learners.

The key source of administrative data on vocational qualifications in the UK is the Individualised Learner Record (ILR), which contains information on all individuals in funded learning in Further Education in England, including details of all their learning aims and learning outcomes. This has been matched to HMRC tax records that include annual earnings received by individuals, allowing the earnings differentials associated with vocational qualifications to be estimated. Examples of papers that have done this include BIS (2013) and Bibby *et al*. (2014). One issue faced by early users of such data sets was that because they were based on funded learners in the ILR, then all observed individuals have been through a period of learning, making selection of a control group of non-learners difficult. The method chosen is typically to compare the earnings of achievers to those of non-achievers with the same learning aim.

The results of such papers show estimated differentials that in many cases are larger than those observed using LFS data as described above, particularly at Level 2.[4] For example, BIS (2013) report positive and significant earnings differentials of 12% for City and Guilds[5] and 6% for NVQs at this level,

[4] Conlon *et al.* (2017) reconcile these different results using survey and administrative data, taking into account differences in specifications, control groups, variables and samples used. No one difference consistently explains variation in results across data sets for every qualification, though the lack of hourly wage and the restriction to younger learners in the administrative data are often both important. When estimated on specifications as similar as possible, both data sources produce very similar results.

[5] City and Guilds qualifications are perhaps best known for providing construction skills, though they also offer qualifications in a wide range of around 25 areas, including engineering, IT, plus service sector areas such as retail, hospitality and hairdressing. Course durations vary but are typically one year at Level 2 and up to three years at Level 3. Level 1 courses are typically short, introductory courses, for example 4-6 weeks. Some may involve full-time study in colleges, with others are taken part-time whilst in work.

seven years after completion of the qualification. Similarly, Bibby *et al.* (2014) find that a full Level 2 qualification is associated with 11% higher earnings for achievers relative to non-achievers, averaged over the period 3-5 years after attainment.

The need to use a non-achievers control group has been relaxed somewhat recently, through the possibility of merging school records from the National Pupil Database (NPD) into the ILR, so that differentials can be estimated against a control group whose highest qualification is one level below the one being considered. Research using such data by Patrignani *et al*. (2017) continues to find strong and positive differentials for Level 4 vocational qualifications, Apprenticeships, and NVQs at Levels 2 and 3, though not for BTEC qualifications at Levels 2 and 3 for men, or for any vocational qualifications at Level 1 bar NVQs for men, in their fully controlled ('augmented plus') specification.

While recognising the usefulness of administrative data for research, which is only likely to develop further as such data sources are matched together where possible, this paper continues the research line using LFS data. The primary reason is that the LFS contains information on occupation, which will be important for the analysis of subject area of qualifications, as discussed in the Methodology section below. Occupation is not found in the currently available administrative data in the UK. In addition, using the LFS allows us to compare our results to earlier studies summarised above, to determine the contribution to the literature made by our extensions. The next section discusses the data set used in more detail.

The key contribution of this paper is to examine, in much more detail than previously studied, the variation in the wage differentials across characteristics of the qualifications. Given the number of available qualifications, as described above, there are clearly many ways in which they will differ. We focus on differences in the key characteristics of type, level and subject. Since subject of qualification is closely related to the occupation in which an individual works, particularly for vocational qualifications, then we will also look at differentials within occupations, which turns out to be important. Other contributions of this paper include the fact that we use quantile regressions to

examine wage differentials at all points in the distribution, not just at the mean, and that we examine the robustness of the results to various decisions made about how to treat the LFS data.

The following two sections describe the data set and methodology to be used. Section 4 contains the results of the analysis, while a final section summarises and concludes.

2. Data

The data used are from the UK Labour Force Survey (LFS), pooled over the period 1997-2019. The LFS is a representative survey of around 38,000 households per quarter, with each household remaining in the survey for five consecutive quarters. All persons aged 16 or over in the selected household are surveyed. We kept information only from individuals' first appearance in the survey, to ensure that each individual appeared only once in the final data set.[6] This produced a sample of just under half a million observations with valid wage data.

The LFS contains detailed information on all qualifications held by an individual. For each qualification, additional information is provided on the type (BTEC, NVQ etc), the level and the subject area. Given the large number of observations available to us, we can interact all three characteristics and so estimate the wage differentials associated with each combination of characteristics. Of course, not every combination of the three characteristics exists in the data set, for example not all subjects are offered by each qualification type. For each individual we identify their highest qualification, with the attention focussed on this in the analysis.[7]

[6] Wages are reported in their first and fifth appearances in the survey. The first wave was used as it contained more observations. Using the fifth wave instead made no difference to the pattern of results.

[7] Hence we estimate so called 'marginal returns', for each qualification looking at those who hold that qualification as their highest. The alternative method, so called 'average returns', is to estimate wage

Figure 1 illustrates the distribution of the employed individuals in our sample according to the level and type (academic or vocational) of their *highest* qualification. As can be seen, around one-third have achieved a degree level qualification, with this group excluded from the analysis that follows. Following this, the next largest group is individuals with school qualifications obtained at the end of lower secondary education (GCSEs). This does not, of course, mean that more individuals hold such qualifications than any other, but rather that more individuals hold them as their highest qualification. Thus, more individuals hold Level 3 academic qualifications (A Levels) overall, but most of those go on to achieve a degree, and so fewer hold such qualifications as their highest. Within levels, Figure 1 shows that more people hold academic rather than vocational qualifications as their highest. This is partly due to our decision to rank academic qualifications higher within levels in the hierarchy of qualifications, so that anyone holding both academic and vocational qualifications at the same level will have the academic ones ranked as their highest.

Wages are reported for any time period that the respondent wishes (hourly, monthly, annual etc). For those who do not report an hourly wage directly, we use information on their usual number of hours worked per week, to derive an hourly wage measure for all individuals. This was then deflated by a price index to take account of changing value over time, and then logged.

Potential control variables of interest found in the LFS include gender, age and its square, ethnicity, public sector, full time status, plus region and year fixed effects. While some, such as public sector and full-time status, could be seen as outcome variables, experimenting with dropping these variables made only very small differences in the results.

differentials using information on all individuals who hold that qualification, whether or not it is their highest. Both methods have their advantages and disadvantages, but here we focus on the marginal returns, since reaching a new highest qualification is of more policy interest, and it lends itself more easily to the analysis adopted here using specific control groups.

3. Methodology

The wage differentials we observe are derived from OLS wage equations of the form

$$Ln\ W_i = \sum \delta_j Q_{ji} + \boldsymbol{\beta X_i} + \varepsilon_i$$

where $Ln\ W_i$ is the natural log of the real hourly wage of individual i, Qj_i is a dummy variable to indicate whether qualification j is held by individual i, $\boldsymbol{X_i}$ is a vector of other control variables, and ε_i is a disturbance term. A separate equation is estimated for qualifications at each level, with dummy variables for all vocational qualifications of interest at that level included in the same equation. The sample includes all individuals whose highest qualification is a vocational qualification at the level of interest, plus all individuals in the control group being used. For each level of 'treated' qualifications, three equations are estimated with three different control groups: (i) all individuals whose highest qualification is one level below the level of interest; (ii) all individuals whose highest qualification is specifically a vocational qualification one level below the level of interest; and (iii) all individuals whose highest qualification is specifically an academic qualification one level below the level of interest. The reference category in each estimated equation comprises those individuals in the control group, and all the δ_j coefficients on the qualification variables are interpreted relative to this group.

Our results should therefore be interpreted as descriptive rather than causal, and we make no claims to causality. Clearly, qualification attainment is non-random, and will be determined by selection effects into the qualifications of interest, and then ability and motivation effects on the likelihood of completion and attainment. Ideally, we would use techniques allowing us to identify causes of exogenous variation in qualification attainment. This has proved possible in previous research on returns to education, where the education being considered has been a general measure such as total

years of education acquired.[8] Given the nature of the exercise being undertaken here, however, where the specific research question is the extent to which there is variation in estimated wage differentials across a large number of qualification types, levels and subjects, then it is not possible to pursue such a methodology, since separate sources of exogenous variation for each qualification type and characteristic cannot be identified.

The extent to which the estimated coefficients will pick up other characteristics in addition to the direct causal impact of the qualification itself will vary according to the control group being used. In particular, selectivity effects depend on the characteristics of the individuals who choose to enrol into the vocational qualifications of interest. Given that, on average, individuals of lower prior attainment, and thus by assumption lower ability and/or socio-economic support, are more likely to undertake vocational education, then the likely effect of such selectivity will be to reduce estimated wage differentials, when the control group consists of all individuals qualified at the lower level and in particular when the control group consists of individuals with specifically academic qualifications at the lower level. The use of the control group featuring individuals with specifically vocational qualifications at the lower level is our attempt to mitigate this selectivity effect as far as possible. Thus, in this case, for each vocational qualification of interest, we are comparing the wages of holders to the wages of similar individuals who also selected into vocational education, but who have only achieved at one level lower. This specification will therefore be our main specification of interest. Of course, other unobserved characteristics of individuals will still be correlated with the attainment of the higher level qualification of interest, so that all the wage gap between vocational qualifications at different levels can still not be attributed causally to the qualification attainment itself. To this, we argue that the main purpose of this paper is to show the variation in wage differentials across different

[8] For example, raising of the school leave age has been used as an instrument for the total years of education acquired (amongst many examples using this method, for the UK Harmon and Walker (1995) is probably the most cited).

types, levels and subjects of qualification. To the extent that some of the effects of unobserved individuals' characteristics will be common to different qualifications, these will cancel out when we compare the results for different qualifications.

A further issue that is rarely addressed in the wage returns literature, and which we acknowledge we do not address either, is the fact that the analysis is based on a selected sample who are in employment. On the reasonable assumption that higher qualifications facilitate the successful acquisition of employment, then the wage differential analysis is comparing a treatment who get a job with their higher qualification and a control group who do not have that higher qualification but have nevertheless still been successful in getting a job. This success of the latter group in securing a job despite their lower qualification may suggest above average levels of other, unobserved, desirable skills or abilities in this group. If so, this would lower the estimated wage differentials between this group and the treated group with the higher qualification. Against this risk, we would argue that unemployment in the UK during the period studied has been very low and close to full employment, with the exception of the period around the financial crisis of 2008, and so selection effects into employment should be minimal, with most who wanted a job in this period being able to get one.

Having presented the results from the base specifications for each qualification, the analysis continues with two extensions. We undertake quantile regression analysis, to estimate wage differentials to qualifications at all points of the wage distribution, and not just at the mean. We then take into account the subject of qualification obtained. To do so, rather than estimate separate equations for each level, as above, a single equation across levels is estimated, with the Q_{ji} now representing separate dummy variables for each level/subject combination when held as a highest qualification. In this specification, the comparison group becomes those individuals with no qualifications, so that each subject can be compared to a common comparison.

One issue with the subject specific wage differentials is that they will be greatly affected by the occupation to which the qualification of interest typically leads, when each subject-specific

qualification is compared to a common control group. While such information is undoubtedly of interest to a young person making a decision about the area that they would like to work in, in terms of estimating the gain in wages from acquiring a qualification, it is of more interest to look within occupations, and so compare individuals working in an occupation with a particular vocational qualification, to individuals whose highest qualification is one level lower and who are *working in the same occupation.* To make this comparison, we interact the subject/type/level dummy variable indicating a particular qualification held as an individual's highest, with an indicator of whether the individual works in an 'appropriate' occupation for that qualification (e.g. in hairdressing, for a hairdressing qualification). The coefficient on the non-interacted qualification variable is then interpreted as the return to that qualification if the individual works in a non-relevant occupation, while the coefficient on the interaction term shows the additional return to that qualification from working in a relevant occupation. The sum of the base coefficient and the interaction coefficient is then the total return to the qualification in the relevant occupation, relative to individuals with no qualifications (the reference category) *in the same occupation.*

4. Results

The main results are presented in Tables 1, 2 and 3, for vocational qualifications at Levels 4, 3 and 2 respectively. In each case, three comparison groups are used, comprising all individuals whose highest qualification is one level below the level of interest, all individuals whose highest qualification is a vocational qualification at one level below the level of interest, and finally all individuals whose highest qualification is an academic qualification at one level below the level of interest. For each comparison group, three equations are estimated, for all individuals, males and females, producing nine specifications in total at each level. The tables report the estimated wage differential, measured as $100(\exp(\beta) -1)$, where β is the relevant coefficient in the estimated wage equation.

Considering Level 4+ qualifications first, in Table 1, it is clear that BTEC qualifications are associated with large wage differentials relative to individuals at Level 3, for both genders. As expected, the wage differentials are higher relative to individuals who hold vocational qualifications at Level 3 as their highest, than when compared to individuals who hold academic qualifications at Level 3 (A levels) as their highest, though both are positive and statistically significant. Thus, amongst those who have selected into vocational education rather than followed an academic path, and who have reached at least Level 3, then there is a large wage differential associated with going on to achieve at Level 4, of around 25% for BTEC qualifications. NVQ Level 4 and 5 qualifications also earn positive returns relative to Level 3 overall, and specifically vocational Level 3, with those for females approaching the returns achieved by BTECs. Note that for males, the estimated wage differential for NVQ5 is lower than for NVQ4, though never statistically significantly so. This is likely due to selection effects, with NVQ5 offered to and achieved by relatively few individuals in a select number of areas.

Turning to Level 3 qualifications, their differentials relative to Level 2 are reported in Table 2. The main messages from the Level 4 results in Table 1 are repeated. Thus, substantial wage differentials between vocational qualifications at the two levels are again observed, which differ by type of qualification and by gender. BTEC qualifications are again observed to have the highest differentials, of 36% for males and approaching 30% for females. For the latter, RSA and GNVQ qualifications at this advanced (Level 3) achieve similar differentials relative to Level 2 vocational qualifications. For most qualifications, the observed wage differentials are larger for men than for women, with the exception being the administrative RSA qualifications. The wage differentials between holders of vocational qualifications at Level 3 and Level 2 are the largest observed in this study. For those progressing up the vocational hierarchy of qualifications, reaching Level 3 therefore seems to be the key achievement in terms of wage differentials. When comparing specifically to those with academic qualifications at Level 2 as their highest (columns 7-9), or to any Level 2 qualification (columns 1-3), which are similar since the majority of those with Level 2 as their highest do so via academic qualifications, then only BTECs and GNVQs achieve a positive and significant wage differential. For males the former is larger,

while the reverse is true for females for whom GNVQ have a larger differential (though the difference is not statistically significant in this case).

Finally, the results for Level 2 vocational qualifications relative to individuals with Level 1 qualifications are reported in Table 3. Despite the qualifications in this comparison group being at a particularly low level (below what would be expected of a 16 year old school leaver), the wage differentials attached to these Level 2 qualifications are relatively small, and considerably smaller than those observed in previous tables. In addition, BTEC qualifications do not secure the highest wage differential at this level. Rather, when the comparison group is those with vocational qualifications at Level 1, the highest differentials are for women with RSA Level 2 qualifications , and men with City and Guilds Level 2 qualifications (both around 11%). The BTEC wage differentials nevertheless remain positive and statistically significant.

In summary, therefore, while positive and significant wage differentials are observed for at least some vocational qualifications at every level relative to the level below, the largest differentials are observed between Levels 2 and 3, suggesting that this is a key attainment level for those following a vocational route, while the few learners who progress further to higher level (Level 4+) vocational qualifications also continue to see real wage differentials, relative to those with vocational qualifications at Level 3 as their highest.

The previous discussion has highlighted that, even within levels, there is variation in the estimated wage differentials, across different types of qualifications. The remainder of this results section considers alternative sources of variation in the estimated differentials, focussing on unobserved characteristics of the individuals (as implied by their position in the wage distribution) and on field of study (subject) of the qualification.

In order to consider the unobserved characteristics of individuals, quantile regressions were run to estimate the wage differentials at each point in the conditional wage distribution, rather than only at

the mean. For this analysis, the comparison group comprised individuals with no qualifications. This allowed the quantile regressions to all be run against a consistent comparison group for ease of exposition rather than re-running all of the specifications for the various comparison groups as in the earlier analysis.

The results, showing the estimated differential at each percentile in the wage distribution for three of the vocational qualifications, are shown in graphical form, in Figure 2. The wage differentials across the wage distribution are shown for each qualification on a separate graph, with 95% confidence intervals shown around the quantile estimates. The most common result is that the estimated differentials increase with the percentiles of the wage distribution, at least until the very top of the wage distribution, for qualifications at Level 3 and above. At lower levels, the profiles are generally flat across most of the distribution.

The general finding is therefore that the upward slope of the profiles over the wage distribution increases with the level of vocational qualification. Those at the higher end of the wage distribution, conditional on the observed variables, have higher levels of wage-generating unobserved characteristics, for example ability and motivation etc. These results suggest that, at least at Level 3 and above, that vocational qualifications are complementary with ability, with the larger differentials being earned by vocational qualification holders of higher ability. Thus, vocational qualifications should not be seen as being designed solely for those of lower ability as a consolation for those who have failed on the academic route, but rather as being associated with, in some cases, improved labour market outcomes for those of higher ability. Even at the lower levels (Levels 1 and 2), the vocational wage differentials are at worst independent of ability (a flat profile).

The final source of variation in estimated wage differentials investigated was variation by subject of qualification. The results of this analysis are also displayed graphically, to aid comparisons across subjects, with a separate graph for each qualification type (see Figure 3 and 4 for Levels 3 and 2 respectively). At Level 3, we focus on the qualifications most frequently held, namely BTEC and NVQ

qualifications.[9] The graphs show the point estimates for the estimated wage differential for each subject, with its corresponding 95% confidence interval. In each case the point estimate is derived from the estimated coefficient on a dummy variable indicating each combination of level and subject of qualification when held as a highest qualification, with a separate equation estimated for each qualification type.[10] As previously, the effect is calculated as the exponential of the estimated coefficient, minus one, and multiplied by 100. The comparison group, as with the quantile regression analysis above, is individuals with no qualifications, to aid comparisons across types and levels of qualifications.

The graphs in Figure 3 make clear the large variation in wage differentials at Level 3, when disaggregated by subject, even within qualification type and level groups. For both of the Level 3 qualifications illustrated in Figure 3, the same four subject areas attract the highest wage differentials; specifically, Engineering, Construction, Business and Management. Comparing across qualification panels for qualification types, the BTEC level 3 qualifications in Business and Management earn a higher differential than their NVQ equivalents, while for engineering and construction there is no significant difference across qualification types. Individuals with a Level 3 BTEC qualification in these subjects earn, on average, 41-52% more than individuals with no qualifications. For NVQ3 qualifications, the range is 35-47%.

Another point made clear by Figure 3 is that the wage differentials in other subject areas are not as large, and that these are typically subjects associated with service sector skills, for example Caring, Childcare and Hotels and Catering.

Turning to Figure 4 and Level 2 qualifications, we add in GNVQ and City and Guilds qualifications in addition to BTEC and NVQ. The estimated wage differentials are now much smaller, as would have

[9] Results for other qualifications are available from the authors on request.

[10] Not all subjects are offered at every level by each qualification type.

been expected given the earlier results in Table 3. Nevertheless, some subject areas do attain positive and significant differentials. This is perhaps shown most clearly in the City and Guilds panel, where the positive differentials are for Computing, Engineering, Manufacturing and Construction, whereas for the two service sector subjects (Hotels and Catering, and Hair and Beauty) the differentials are insignificantly different to zero. Similar patterns for NVQ2 are observed, though with some overlap between confidence intervals. Significantly positive returns are observed for Management, Business, Engineering and Construction (the same four subjects as discussed above with respect to Level 3), whereas the service sector subject differentials are either zero or insignificantly different to zero. For BTECs and GNVQs, the relatively small numbers of individuals with such qualifications at Level 2 as their highest produces wide confidence intervals and thus no clear patterns to the results.

As discussed in the earlier Methodology section, however, the subject-specific results are greatly influenced by the sector towards which a qualification leads. We therefore should not be surprised to see an individual with an Engineering qualification earning more than an individual with a Hairdressing qualification, relative to a common comparison group, given the relative wages on offer in the respective two sectors. Such information across sectors is not without interest, in particular for young people who are beginning their working lives and making decisions about what type of job to aim for. For others, however, who are already working in their chosen career, it might be of more interest to them to know how much they can progress their wages *within their occupation* by attaining higher level vocational qualifications. The analysis was therefore extended by introducing a variable indicating whether an individual was in the 'correct' sector for that qualification (working as a hairdresser with a Hair and Beauty qualification for example) and the interaction of this new variable with each qualification of interest. The inclusion of this new variable meant that we had to revert to using a comparison group one level below the treatment group, rather than the no qualifications group, since the correct sector cannot be defined for someone with no qualifications. We therefore chose only one level to illustrate this analysis, choosing Level 3 vocational qualifications relative to

Level 2 vocational qualifications, which was shown in Tables 1, 2 and 3 to be the situation where the largest wage differentials for vocational qualifications are observed.

In this new analysis, the coefficient on the qualification variable itself represents the wage differential between an individual with the Level 3 qualification as their highest and someone in the comparison group with Level 2 vocational qualifications as their highest, both working in a 'wrong' sector (though not necessarily the same one). The coefficient on the interaction between the qualification variable and the 'correct' sector indicator represents the *additional* wage differential between an individual with that Level 3 qualification and someone with vocational qualifications at best at Level 2, both working in the 'correct' sector. Hence, this effect can be thought of to illustrate the effect of qualification progression as a result of vocational learning and training within one's chosen occupation.

The graphs in Figures 5 and 6 show, for NVQ and BTEC qualifications respectively, both the base effect, that is the wage differential in the 'wrong' sector (labelled 'Unmatched Return'), and also the sum of the effects (base+interaction), that is the total wage differential between individuals with the Level 3 qualification and those with vocational qualifications one level lower, all working in the correct sector for that qualification (labelled 'Matched Return').

The first thing to say is that the small number of observations with a particular qualification, in a particular subject, working in a 'correct' sector, means that the standard errors are large, producing the wide confidence intervals seen in Figures 5 and 6. The results are therefore indicative rather than conclusive, but do show that the cases where the 'matched' wage differential is clearly higher (sometimes significantly so) than the 'wrong occupation' wage differential tend to be in service sector occupations, for example in Caring, Hotels and Catering (significant difference), and Hair and Beauty for NVQs, and in Childcare (significant difference) and Hair and Beauty for BTECs. Thus, within these typically low-paying, service sector jobs, there is a definite wage gain associated with increasing one's

job-specific vocational qualification level, for individuals who have already chosen to work in such sectors.

5. Conclusions

Previous research using survey data in the UK, reviewed above, has shown that individuals who acquire vocational qualifications tend to earn little, if any, more than those individuals without such qualifications. It has been suggested (for example by Dearden *et al.,* 2004) that this may be due to negative selection effects into vocational qualifications, with individuals who select into such qualifications having unobserved characteristics that are negatively related to earning power in the labour market. Dearden *et al.* (2004) showed that if a more appropriate comparison group is chosen, then wage differentials associated with intermediate vocational qualifications (specifically in their case NVQ2) are observed that are positive and statistically significant, though small in size. This is an average figure though, and the aim of this paper was to demonstrate the significant variation in wage differentials around this average, depending on the characteristics of the qualifications.

In order to estimate the wage differentials, a treatment group of observations was formed, consisting of all those whose highest qualification is a vocational qualification. These were then separated by level, and compared to a comparison group of individuals whose highest qualification is one level below the level of interest. Our preferred results focus on the cases where the comparison group was restricted to individuals whose highest qualification is specifically a vocational qualification at one level below. In this way, we make the treatment and comparison groups as similar as possible in terms of their unobserved characteristics – in essence we are comparing 'the sort of people who choose to study for vocational qualifications', in both cases. Other unobserved differences between treatment and comparison group individuals may still exist, which could bias estimated wage differentials. However, given that our main focus is on variation in estimated differentials across types of

qualifications, to the extent that any such biases affect all vocational qualifications, then they will cancel out when we look across qualifications.

The characteristics focussed on were the level, type and subject area of the qualification. In terms of level, the largest differentials are observed for vocational qualifications at Level 3. This is the case particularly for our preferred comparison group of individuals whose highest attainment is a vocational qualification at Level 2. Reaching at least Level 3 therefore appears to be a key level in today's labour market, with its rising demand for skills. Individuals leaving education with at best lower secondary qualifications, or their equivalent, are unlikely to be valued in the labour market, and face the prospect of insecure, low-paid and low-skilled work mostly in the service sector. Such a result is supportive of the UK government's decision to raise the education participation age to 18 in 2015, requiring all individuals to spend some time in post-lower secondary education or training, in the hope of raising attainment at Level 3.

In terms of type of qualification, the results consistently show, within each level, that the highest wage differentials observed are those associated with BTEC qualifications, while the lowest are for NVQ qualifications. Given the characteristics of these two types of qualification, with the former being mostly classroom based in colleges, while the latter are largely concerned with acquiring and certifying competence on the job, then this result highlights the importance of off-the-job learning and the potential for the acquisition of more general skills. This does not mean there is no role for NVQs and on-the-job learning of course, and the acquisition of specific top-up skills, particularly at Level 3 or above, can pay off for some individuals. For an initial qualification at a new highest level for an individual, however, a longer duration, college-based qualification such as a BTEC is more likely to hold more value.

Finally in terms of subject area, our initial findings show the expected result, that differentials are larger for vocational qualifications in areas such as engineering and construction, rather than in service sector areas. For young people still at school, making decisions about what career to follow, this is

important information. Our extended results, however, go on to show that much of the variation in wage differentials across subject areas is associated with occupation, with some leading to higher-paying occupations, such as engineers. Looking within occupations, there is much less variation in estimated wage differentials across subjects. Thus, for older people, in this age of lifelong learning, who have already settled on a particular sector within which to work, the acquisition of vocational qualifications can produce real progression within that occupation. Such nuance has been missed by previous estimates of wage differentials associated with vocational qualifications, when their holders are compared to a general comparison group across occupations, who do not hold that qualification, and thus represents the key contribution of this paper.

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Table 1 : Marginal Returns to Level 4+ Qualifications

	All Level 3			Level 3 Vocational			2+ A Levels		
	(1) All	(2) Male	(3) Female	(4) All	(5) Male	(6) Female	(7) All	(8) Male	(9) Female
BTEC Higher Diploma/HNC/HND	17.86***	18.80***	14.45***	25.18***	26.65***	22.24***	4.64***	3.61***	3.01***
	(0.44)	(0.55)	(0.71)	(0.48)	(0.60)	(0.78)	(0.51)	(0.66)	(0.77)
RSA Higher Diploma	-1.10	-6.86	1.77	6.88***	-0.27	9.75***	-12.66***	-19.29**	-9.06***
	(2.14)	(9.02)	(2.26)	(2.33)	(9.68)	(2.46)	(1.93)	(8.01)	(2.05)
NVQ-4	6.07***	3.31***	9.73***	13.44***	9.99***	18.01***	-6.08***	-8.97***	-2.79***
	(0.80)	(1.26)	(1.05)	(0.87)	(1.35)	(1.13)	(0.77)	(1.18)	(1.00)
NVQ-5	5.39***	0.23	12.15***	12.35***	6.41**	20.58***	-6.49***	-11.68***	-0.27
	(1.85)	(2.49)	(2.72)	(1.98)	(2.66)	(2.92)	(1.67)	(2.24)	(2.45)
N	107522	58585	48937	75170	43228	31942	59955	32617	27338

Standard errors in parentheses, * p < 0.1, **, p< 0.05, *** p < 0.01.

All returns are reported as percentages and calculated from the estimated coefficients as 100*(exp(b)-1) where b is the estimated coefficient for the respective qualification dummy. Control variables are gender, age, age squared, ethnicity, public sector worker and full time status, plus region and year controls.

Treated Group: Individuals with a vocational qualification at level 4 or higher as their highest qualification

Comparison Groups: As shown by column headings, comparison groups are:

Columns (1) – (3): All individuals with any level 3 qualifications as their highest qualification.

Columns (4) – (6): All individuals with a level 3 vocational qualification as their highest.

Columns (7) – (9): Individuals with two or more full A-Levels as their highest qualification

Table 2 : Marginal Returns to Level 3 Qualifications

	All Level 2			Level 2 Vocational			5+ GCSE A*-C		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	All	Male	Female	All	Male	Female	All	Male	Female
BTEC National Diploma/ONC/OND	10.53***	11.46***	8.02***	32.41***	36.65***	28.37***	6.18***	6.17***	4.52***
	(0.50)	(0.72)	(0.69)	(0.75)	(1.13)	(1.01)	(0.49)	(0.70)	(0.67)
RSA Advanced Diploma	2.00	-3.60	3.79**	25.39***	19.46***	25.06***	-2.28	-8.46	-0.31
	(1.54)	(5.94)	(1.61)	(1.94)	(7.41)	(2.02)	(1.48)	(5.60)	(1.55)
City & Guilds Advanced Craft	1.02**	-0.19	-8.67***	21.96***	24.50***	10.08***	-3.89***	-5.60***	-12.16***
	(0.46)	(0.54)	(1.03)	(0.69)	(0.92)	(1.32)	(0.45)	(0.54)	(0.99)
NVQ-3	-1.70***	2.15***	-4.11***	18.15***	23.60***	14.18***	-5.61***	-2.55***	-7.62***
	(0.33)	(0.58)	(0.40)	(0.56)	(0.95)	(0.68)	(0.33)	(0.57)	(0.39)
GNVQ Advanced	8.27***	7.17***	8.39***	27.35***	27.70***	26.41***	4.66***	2.92***	5.24***
	(1.02)	(1.55)	(1.33)	(1.31)	(1.98)	(1.71)	(0.99)	(1.49)	(1.30)
N	121847	55113	66734	59667	31021	28646	109747	50060	59687

Standard errors in parentheses, * p < 0.1, **, p< 0.05, *** p < 0.01

All returns are reported as percentages and calculated from the estimated coefficients as 100*(exp(b)-1) where b is the estimated coefficient for the respective qualification dummy. Control variables are gender, age, age squared, ethnicity, public sector worker and full time status, plus region and year controls.

Treated Group: Individuals with a vocational qualification at level 3 as their highest qualification.

Comparison Groups: As shown by column headings, comparison groups are:

Columns (1) – (3): All individuals with any level 2 qualifications as their highest qualification.

Columns (4) – (6): All individuals with a level 2 vocational qualification as their highest.

Columns (7) – (9): Individuals with five or more GCSEs at grades A* - C or equivalent as their highest.

Table 3: Marginal Returns to Level 2 Qualifications

	All Level 1			Level 1 Vocational			GCSE Grades D-G		
	(1) All	(2) Male	(3) Female	(4) All	(5) Male	(6) Female	(7) All	(8) Male	(9) Female
BTEC First/General Diploma	5.93**	5.44	6.27*	5.85**	9.99**	4.29	5.67***	4.23	6.79**
	(2.47)	(3.72)	(3.24)	(2.53)	(4.03)	(3.26)	(2.48)	(3.70)	(3.29)
RSA Diploma	8.68***	-6.98	11.78***	9.74***	-1.65	11.06***	10.18***	-8.21	14.58***
	(3.07)	(13.31)	(2.72)	(3.12)	(13.99)	(2.75)	(3.17)	(13.15)	(2.86)
City & Guilds Craft	2.58**	3.99***	-1.86	5.19***	11.30***	-2.63	2.56**	2.41*	-0.47
	(1.023)	(1.32)	(1.54)	(1.19)	(1.81)	(1.61)	(1.05)	(1.33)	(1.62)
NVQ-2	-4.64***	-3.70***	-5.55***	-3.78***	1.80	-6.61***	-4.50***	-5.04***	-4.59***
	(0.50)	(0.82)	(0.62)	(0.72)	(1.41)	(0.83)	(0.54)	(0.83)	(0.70)
GNVQ Intermediate	-0.34	1.79	-2.49	-2.67	3.86	-5.55**	0.37	0.71	-1.90
	(2.48)	(4.38)	(2.56)	(2.52)	(4.68)	(2.59)	(2.49)	(4.35)	(2.57)
N	32516	13571	18945	18387	6623	11764	26229	12001	14228

Standard errors in parentheses, * p < 0.1, **, p< 0.05, *** p < 0.01.

All returns are reported as percentages and calculated from the estimated coefficients as 100*(exp(b)-1) where b is the estimated coefficient for the respective qualification dummy. Control variables are gender, age, age squared, ethnicity, public sector worker and full time status, plus region and year controls.

Treated Group: Individuals with a vocational qualification at level 2 as their highest qualification

Comparison Groups: As shown by column headings, comparison groups are:

Columns (1) – (3): All individuals with any level 1 qualification as their highest.

Columns (4) – (6): Individuals with level 1 vocational qualifications as their highest.

Columns (7) – (9): Individuals with level 1 academic qualifications as their highest.

Figure 1: Distribution of Sample by Type and Level of Highest Qualification

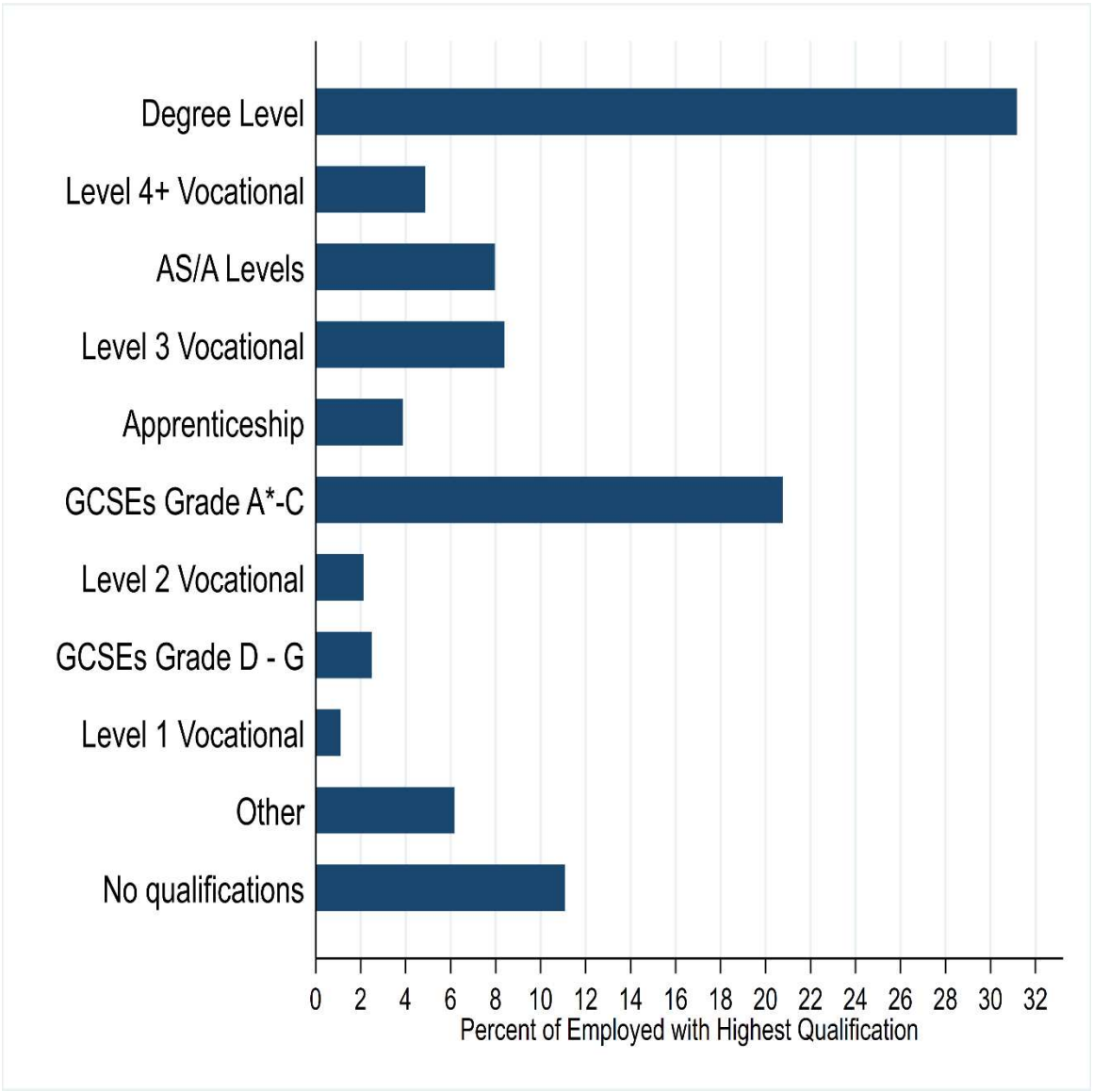
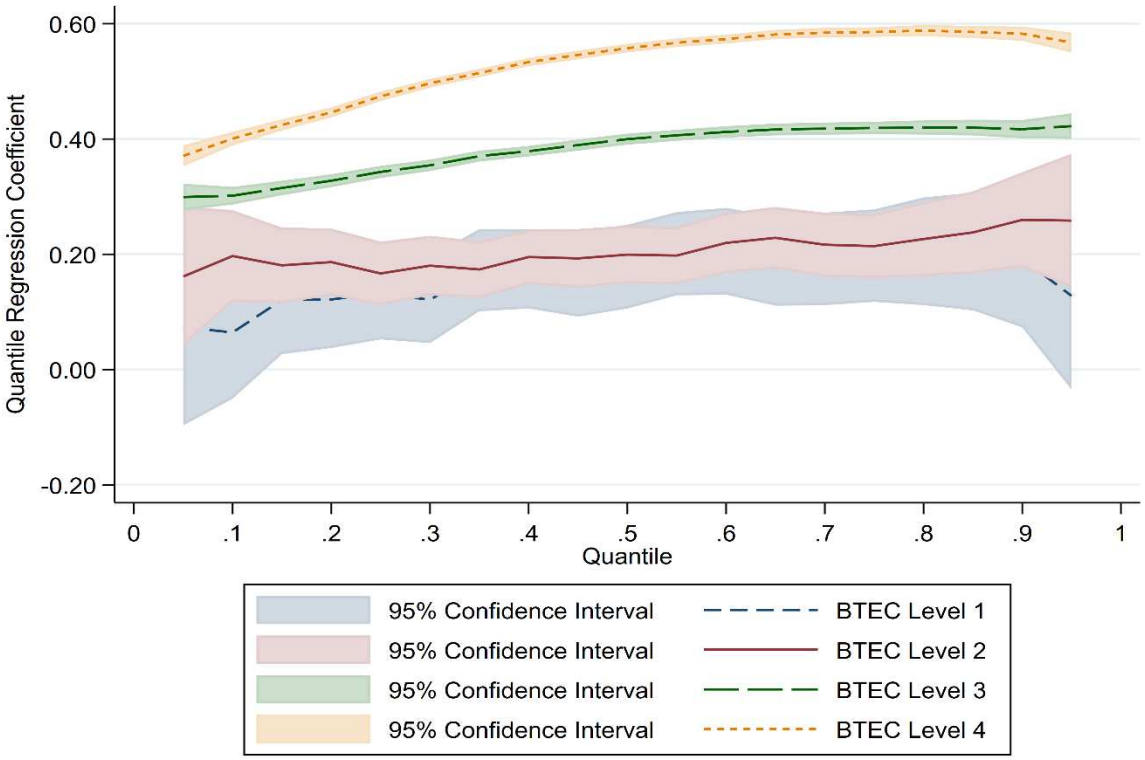
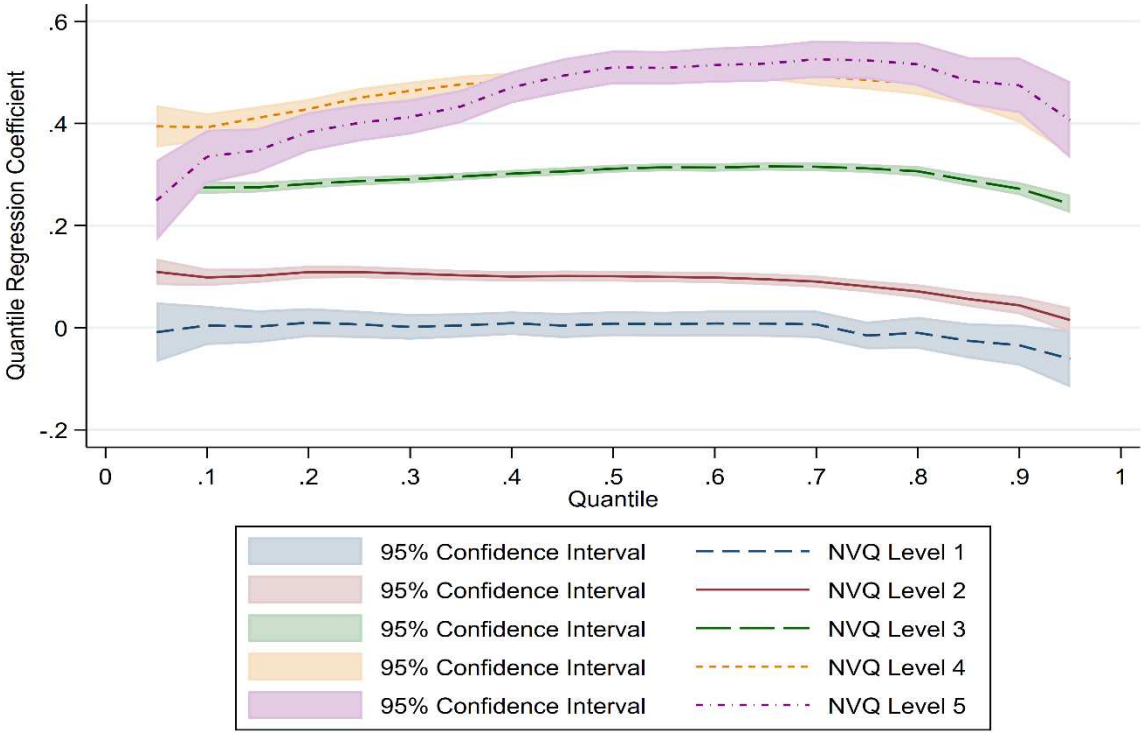


Figure 2: Marginal Returns to Vocational Qualifications by Quantile

a) BTEC



b) NVQ



c) City and Guilds

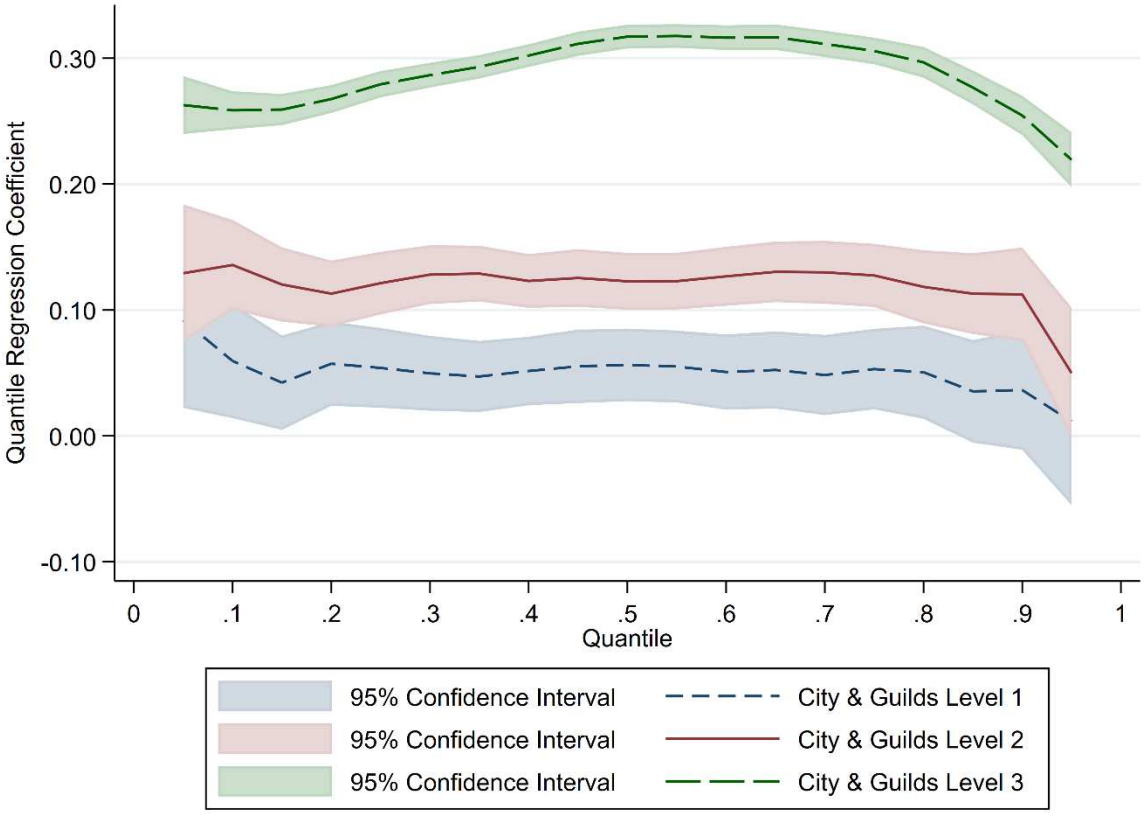


Figure 3: Marginal Returns to Level 3 Vocational Qualifications by Subject Area

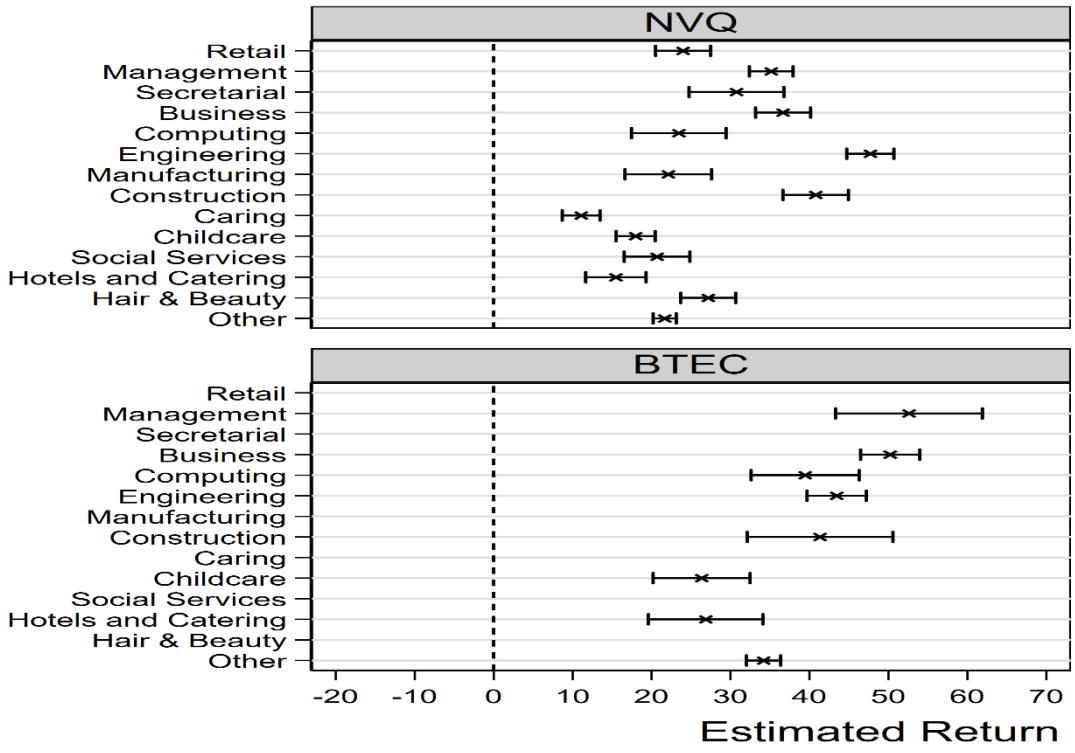


Figure 4: Marginal Returns to Level 2 Vocational Qualifications by Subject Area

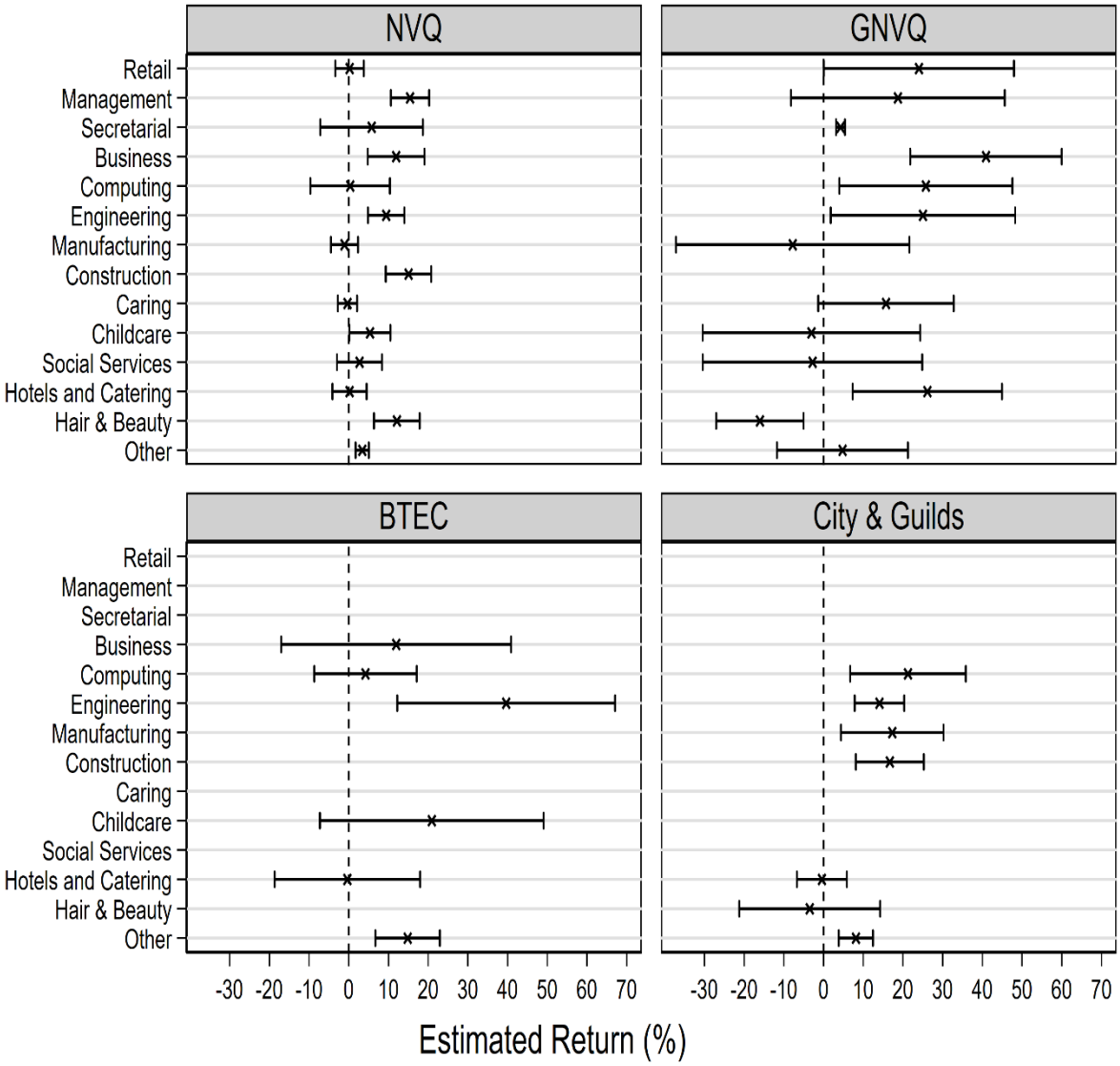
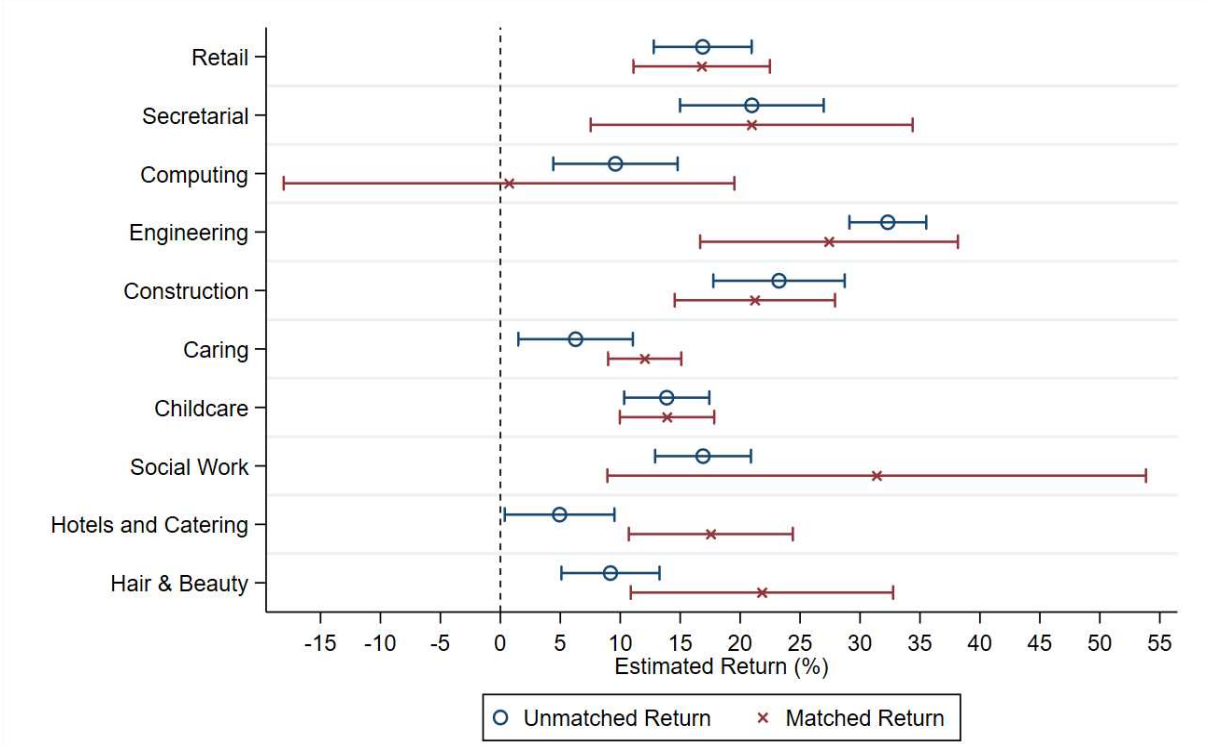
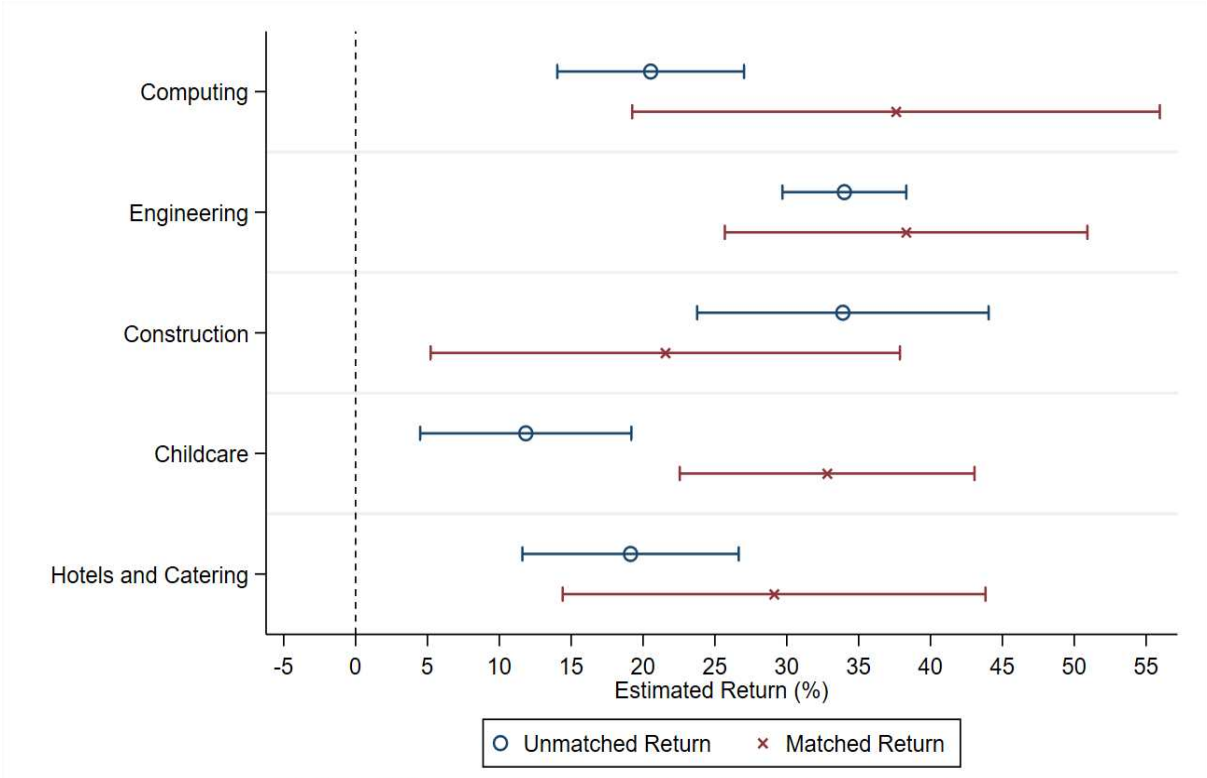


Figure 5: Marginal Returns to NVQ Level 3 by Subject Area, and Occupation



Unmatched Return: Return to an NVQ Level 3 when not working in a subject-relevant occupation.
Matched Return: Return to an NVQ Level 3 when working in a subject-relevant occupation.

Figure 6: Marginal Returns to BTEC Level 3 by Subject Area, and Occupation



Unmatched Return: Return to a BTEC Level 3 when not working in a subject-relevant occupation.
Matched Return: Return to a BTEC Level 3 when working in a subject-relevant occupation.