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Research Discussion Paper 002

October 2016

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Published by:
Centre for Vocational Educational Research
London School of Economics & Political Science
Houghton Street
London WC2A 2AE

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Steven McIntosh* and Damon Morris*

Abstract

This report uses data from the Labour Force Survey covering the period 1997-2015, to estimate wage premiums, or returns, to acquiring vocational qualifications. Different specifications of the wage equations are estimated, alternatively considering individuals who hold each qualification as their highest, and also the average returns across all individuals who hold a qualification whether or not it is their highest. The key message that comes out of the results, is that there is substantial variation in the estimated returns to vocational qualifications, across types of qualifications, levels, study subjects, and across points of the wage distribution. It is therefore not the case that a simple message about *the* returns to vocational qualifications can be delivered. Future work in this area needs to explain this variation in the value of vocational education.

Keywords: vocational education, wages, labour market

JEL codes: I26, I24, J31

Acknowledgements: We would like to thank Sandra McNally and an anonymous referee for helpful comments on an earlier draft, as well as other CVER members attending an internal presentation of the paper, and participants at the WPEG conference at the University of Sheffield in July 2016. The Labour Force Survey data used were kindly provided by the Data Archive at the University of Essex.

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Executive Summary

With the growing availability of administrative data, recent research on estimating the returns to vocational qualifications has used such data to find returns that are similar to existing evidence based on survey data at higher educational levels, but that are higher than such previous estimates at lower levels. The ultimate aim of this strand of work by CVER on returns to qualifications is to document and explain the difference in results between those based on survey data and those based on administrative data. This will be done by estimating the typical specifications that have been presented in the literature using each of the data sources, and then adapting the specifications so that they match as closely as possible, in order to observe which characteristics of the specifications seem to be driving the differences in results. This paper represents the first stage in this process, estimating the typical specifications that exist in the literature when using survey data.

Data from the UK Labour Force Survey (LFS) are used, from the period 1997-2015. As well as being the first stage in a wider project, this paper also adds to the existing literature by providing up to date estimates of the returns to vocational qualifications, and also by disaggregating the results as far as possible, by type of qualification, level and subject area. We also estimate the returns to qualifications across the full wage distribution, rather than just at the mean, using quantile regressions. Finally, we run some new robustness checks to determine the robustness of the results to various aspects of the LFS data. Both average and marginal returns were estimated, looking at all individuals with a particular qualification, and only those for whom the qualification is their highest, respectively. The results across the two specifications naturally differ in numerical size, though are qualitatively similar in terms of their rank and relative size.

The base results show that the estimated returns differ by type of qualification, and by level. Not surprisingly, the estimated returns are higher for higher level qualifications. Within levels, the returns are typically highest for BTEC qualifications, and lowest for NVQ qualifications. The highest observed returns are therefore to HNC/HND qualifications, which are BTEC qualifications at level 4. The results show that across all individuals who hold them, an HNC/HND qualification has an average return of 13%, comparing the wages of those with and without such a qualification and holding all other qualifications held constant. Amongst those who hold an HNC/HND qualification as their highest, they earn 58% more, on average, than individuals with no qualifications at all.

At Level 3, the estimated returns are typically smaller than at Level 4, though are still positive and statistically significant for each type, the exception being average returns to NVQ3 qualifications. The highest returns, as usual, are to the BTEC Level 3 qualifications, with an ONC/OND qualification being associated with 7% higher wages, on average. Average returns to apprenticeships, in general, are also relatively high at around 9%. At Level 2 and below, no vocational qualifications receive positive and statistically significant returns, with the exception of the BTEC qualifications, with average returns of around 2% in the latter case.

Comparing the returns received by male and female workers, there are some consistent differences across the genders. In particular, the estimated returns to BTEC qualifications are typically higher for men than for women, with HNC/HND qualifications, for example, associated with 15% higher wages for men but 9% higher wages for women. In the case of apprenticeships and higher level City and Guilds qualifications, only men seem to earn a positive wage premium. On the other hand, only women receive positive and significant returns to RSA qualifications. Only for NVQ qualifications does there seem to be little difference across the genders.

In addition to the highest qualification estimates discussed above, where the comparison group was individuals with no qualifications at all, we also considered more natural comparison groups comprising individuals whose highest qualification was one level below the qualification being considered, thus allowing us to see the step up in wages when each new level is reached via the vocational route. Whether the qualification below is academic or vocational makes a difference to these 'step' estimates of the marginal returns, with the estimated returns being higher in the latter case than in the former. For example, an individual with an HNC/HND qualification as their highest earns on average 7% more than an individual with A levels as their highest qualification, but on average 19% more than an individual with a vocational Level 3 qualification as their highest. The other point to make with these estimates is that the slope of the change in wages as each new level is reached is quite similar across qualification types. The higher marginal returns to BTEC Level 4 qualifications compared to other Level 4 qualifications is therefore due to a higher initial return at Levels 1 and 2, rather than a steeper slope across levels.

When estimating quantile regressions, deriving the returns to vocational qualifications at each point in the wage distribution rather than just at the mean, the results showed that, for most qualifications, the size of the returns increase as we move up the wage distribution, at least

until the very last few percentiles are reached. Thus, there is no evidence that vocational qualifications only yield benefit for those lower in the wage distribution who have lower wage-enhancing unobserved characteristics such as natural ability. Rather, the larger returns seem to go to those higher up the wage distribution. The exceptions to this are the lower level qualifications, particularly lower level RSA and NVQ qualifications where the quantile function does slope downwards, suggesting larger returns at the lower end of the wage distribution.

Finally, we considered subject of qualification. The results show that, consistently across all types and levels of qualifications, the vocational subjects that yield the highest returns are Engineering, Construction and Business, while the estimated returns are much lower in subject areas such as Caring, Childcare and Catering. Much of this differential is due to the occupations to which the different subject areas lead, with for example Engineering jobs typically being better paid than Childcare jobs. When we look *within* occupations, the estimated returns are much higher for the service sector subjects, becoming closer to the Engineering and Construction returns. Thus, an individual within the childcaring occupation with even a Level 2 qualification will earn more on average than an unqualified individual in the same occupation. Whether an individual is interested more in the returns across occupations or within occupations will depend on whether or not they are already working and have already chosen their occupation.

The main conclusion to take away from the various estimated returns in this paper is therefore the large variation in wages earned, on average, across type of qualification, level and subject, and across different points of the wage distribution. It is therefore not correct to talk about generic returns to vocational qualifications, but rather this variation should be recognised, with some qualifications earning very healthy returns.

1. Introduction

This paper analyses the labour market returns to vocational qualifications in the UK, as observed in Labour Force Survey (LFS) data. Specifically, the aim is to identify the wage differentials and changed employment likelihood associated with the attainment of vocational qualifications. As such, the analysis adds to a large literature on returns to education that can be traced back to Becker's (1964) Human Capital Theory and Mincer's (1974) empirical specification of that theory. While the original models talked about the return to an additional year of education, other work since then has focussed on particular qualifications, which is the approach taken here.

The paper is the first output from a larger project looking at wage returns using a variety of data sources. Survey data, in particular the Labour Force Survey, has traditionally been used in such research, due to its rich information on both qualifications and labour market status (see, for example BIS, 2011, and McIntosh, 2009). More recently, however, administrative data have become available, matching information on education participants with their income and benefit details, in order to estimate the returns to qualifications (see for example BIS, 2013 and Bibby *et al.*, 2014). Focussing in particular on vocational qualifications, estimates using these two data sources have typically produced quite different results, particularly for lower level vocational qualifications, with the positive returns estimated using administrative data contrasting with the often zero or even negative returns obtained when using survey data. The cause of these opposite results is likely to be the different specifications for the estimated wage equations that are used. We have identified a few such differences, with the difference in comparison groups between the two approaches being a likely source of much of the variation in results. In particular, much of the existing work with the administrative data has used as a comparison group those who enrol for the same qualification but do not complete it for some reason. Such a comparison group is chosen, because the administrative data set used is based around the Individualised Learner Record (ILR) and so only contains those who have registered on a funded Further Education course; there are no non-learners to form a comparison group. Estimated returns produced using survey data, on the other hand, typically compare the earnings of those with and without a particular qualification.

One of the aims of the overall project on wage returns is to explain and reconcile the results using the two data sets. We will therefore estimate the ‘standard’ specifications that have previously been used in each approach, and then step-by-step modify the specifications to match each other as closely as possible. This report is a first step in this process, replicating previous analysis that has been undertaken on the Labour Force Survey, to estimate returns to vocational qualifications. As well as replicating previous work, we also extend this prior literature in a number of ways. First, we update previous estimates in the literature using the most recently available LFS data, up to 2015. Second, we make use of new information in the LFS to determine the robustness of previous estimates to the inclusion of *all* qualifications obtained. Third, we consider the subject of the vocational qualification, as well as its type and level. Finally, as well as estimating the average return to a qualification at the mean of the distribution, we also produce quantile regression results to determine the wage premiums to different qualifications across the full conditional wage distribution.

The results in this report discuss the estimated returns to a range of vocational qualifications, disaggregated by type, level and subject. It is therefore worth briefly describing these qualifications at this point, before proceeding.

In terms of levels, the most relevant levels for our purposes are Levels 2 and 3, where the majority of vocational qualifications acquired in the UK are found (see Table 1 for number of individuals observed with different qualifications). Level 2 is notionally equivalent to an individual achieving 5 or more grade A*-C GCSEs. An individual who had not achieved this standard in their GCSEs but wanted to continue in Further Education would therefore typically enrol in a vocational programme at this level, at age 16. In most cases they would expect to have obtained some GCSEs, however, and would not go onto a Level 2 course completely unqualified. It is also the case that level 2 vocational qualifications can be studied in individual subjects between the ages of 14 and 16 whilst still at school, as replacements for the more academic GCSEs.

Level 3 is notionally equivalent to achieving 2 or more A levels. Vocational qualifications at this level would typically be taken somewhere between the ages of 16 and 19, usually as an alternative to the academic A level programme, though occasionally alongside a single A level. Many, including BTEC and City and Guilds, are given ‘tariff points’ so that they can be taken into account for admission to Higher Education courses at universities (though some of the more prestigious universities may insist on at least one actual

A level to be considered for entry). To gain entry to a Level 3 qualification, the individual would typically be expected to hold a Level 2 qualification. The typical entry route would be therefore be a young person who had achieved 5 or more grade A*-C GCSEs, or someone who had obtained a relevant vocational qualification at Level 2.

Aside from these two levels that are most often observed, vocational qualifications can also be held at Level 1, or at all levels above Level 3, though beyond level 4 the numbers are very small indeed, and are not included as a separate category in an analysis in this paper. Those studying at Level 1 are those who are not thought to have the ability to cope with a Level 2 course, and so enter a Level 1 course first, almost always with the intention of progressing to Level 2. Level 4 qualifications are moving into tertiary level education, and will typically involve a minimum of two years study at a college or some of the newer universities. Entrants would be expected to hold A levels, or a relevant vocational Level 3 qualification. They would most often be taken between the ages of 18 and 21.

Note that the ages given above would be the age that a young person would typically take each of the qualifications, were they to progress directly from school into Further Education. However, there is nothing to stop older individuals returning to a period of learning, either full-time or whilst remaining in their position of employment. With the increasing focus on lifelong learning, older learners are an increasing proportion of learners, as they update their existing skills or learn new ones to cope with the changing needs of the labour market.

Across and within the various levels, there are many different qualifications, which can be broadly classified by the type, and then within type by subject of study. BTEC (Business and Technology Education Council) offers a range of qualifications at all levels, and in a wide variety of subject areas, though as the name suggests, they are best known for business-related and technological qualifications. A full BTEC national qualification (Level 3) would be studied for over a period of two years (equivalent to the academic A levels), though shorter courses can be taken, usually for one year, that are broadly equivalent to 1 A level, and are therefore expected to be studied beside something else. In most cases, it would be taken full-time at a Further Education college. A BTEC Higher National (Level 4) similarly typically requires 2 years of full-time study, either at a Further Education College or at some Higher Education institutions. Below Level 3, BTEC Firsts (Certificates, Extended Certificates and Diplomas) can be studied in a variety of sizes, for example the equivalent of

just one GCSE, studied alongside actual GCSEs, typically by 14-16 year olds, to a full Level 2 qualification in its own right, usually studied in colleges post-16 by young people who have not achieved this level in school.

City and Guilds qualifications are perhaps best known for providing construction skills, though they offer qualifications in a wide range of around 25 areas, including engineering, IT, plus service sector areas such as retail, hospitality and hairdressing, in addition to construction. The vast majority of qualifications are offered at Levels 1-3, and they are the only levels that we observe in our data set. As with BTECs, City and Guilds qualifications come in a variety of sizes and durations, though on average a Level 2 course might be expected to last for one year, and a Level 3 course for three years. Level 1 courses are typically short, introductory courses, for example 4-6 weeks. Some may involve full-time study in colleges, with others taken part-time whilst in work.

RSA (Royal Society of Arts) qualifications¹ are typically courses in professional typing and word processing. Most such qualifications are obtained at Levels 1-3, typically by attendance at college, often in evening classes. Entry requirements are usually the holding of a relevant qualification at the previous level, plus a demonstrated typing speed. Courses are short, 20-30 hours of study time at Levels 1 and 2, and up to 60 hours at Level 3.

Finally, NVQs (National Vocational Qualifications) are typically work-based qualifications, in which the learner has to demonstrate competence in the particular field. Such competence could be acquired through on-the-job training, day-release study at a college, and/or simply learning through experience whilst working. There is therefore no fixed duration for courses. NVQs are available in a wide range of areas, most frequently in service areas, though also in manual areas such as engineering and construction. NVQs are available, and are observed in our data set, from Level 1 to Level 5, though are acquired in much smaller numbers at higher levels. General National Vocational Qualifications (GNVQs) were available for the period 2000-2007, and were more college-based than their NVQ equivalents. They were most often taken by 16-18 year olds who had not acquired good GCSE grades.

The next section briefly describes the LFS data available to us, followed by a discussion of methodologies in Section 3. The results of the analysis are presented in Section 4, while a final section offers some concluding thoughts.

¹ RSA qualifications are also known as OCR (Oxford, Cambridge and RSA) qualifications.

2. Data

Labour Force Survey (LFS) data are used from the period 1997-2015. The LFS is a representative survey of around 38,000 households, representing around 0.15% of the population and making it the largest household survey in the UK. It is a rotating panel, whereby each household is in the survey for five successive quarters, and one-fifth of the sample are updated each quarter. All adults over the age of 16 in the household respond to the survey, by proxy if not all members are present at the time of the survey.

To create the sample used in this study, we used information provided by working age adults in their first appearance in the survey only. This ensured that individuals only appeared once in the final data set.² Pooled across all years, this produced a sample of just under half a million observations with wage data, with which to estimate the wage equations.

The LFS provides extensive information on the qualifications held by individuals. Respondents are provided with a list of qualification types (GCSEs, BTEC, City and Guilds) etc, and asked to indicate *all* of the types that they hold. For each type reported, they are then asked a supplementary question asking them to report their highest level qualification within that type. We therefore do not observe *all* qualifications held within a particular type, only the highest. We therefore make some assumptions about the lower qualifications that they are likely to hold, based on having the necessary qualifications to progress. For example, an individual with an Advanced Craft (Level 3) City and Guilds qualification but without good GCSEs can be assumed to hold a Craft (Level 2) City and Guilds qualification, on the basis that they would not have been allowed onto the higher level qualification without one. Note that from 2011, LFS respondents are asked to report *all* qualifications that they hold within each type, so for those years we can run an equation using accurate information on all qualifications, to determine whether the results change and hence check the accuracy of our assumptions about lower level qualifications.

In addition to type and level, the LFS also asks respondents to report the subject of their qualification. Given the large number of observations available to us, we can interact all three characteristics of the qualification, and investigate for example, the returns to a NVQ Level 3

² We investigated the possibility of making use of the longitudinal element of the survey by using multiple observations on the same individual in a panel analysis. However, too few individuals obtained a vocational qualification during the period in which they were in the survey.

qualification in Engineering. Note that every subject is not offered by every qualification type, and in some cases, the number of observations in our sample is too small, so not every combination of type, level and subject is observed in the results.

Table 1 contains descriptive statistics showing the proportions of the sample holding the various qualifications, disaggregated by type and level.³ The numbers in the table show that, overall, amongst the adult population of working age, an apprenticeship has been the most popular form of vocational learning. There is a good spread of observations across other qualification types, though they differ in terms of their most popular level. For BTECs, the modal level is Level 4 (HNC/HND), whereas this is Level 3 for City and Guilds, Level 2 for NVQs and Level 1 for RSA. There are significant differences by gender (columns 2 and 3), with men significantly more likely than women to hold an apprenticeship, City and Guilds or higher level BTEC qualification, while women are more likely to hold NVQ and, particularly, RSA qualifications. Over the 1997-2015 time period observed, there is a large increase in the proportion of the adult population holding NVQs, understandably as they were relatively new at the beginning of the period (columns 4-6). BTEC qualifications remain of approximately equal popularity, in proportional terms, over the period. All other vocational qualifications display falling numbers, however, in both absolute terms and proportionally. This is particularly the case amongst the low level RSA qualifications that had been observed in quite large numbers at the beginning of the period.

A number of other variables are included in the wage equation to control for other determinants of wages that may potentially be correlated with vocational qualification receipt. These variables include gender, age, age squared, ethnicity, public sector worker⁴ and full time status, plus region and year controls. The dependent variable is the log of the hourly wage, deflated to allow for the effects of inflation over time.

³ There are some examples of small cell sizes in Table 1, particularly with RSA qualifications for men, and this should be borne in mind when considering any results in this category. There are also some small cell sizes for particular qualifications in individual years, though we do not attempt to estimate year-specific returns for any qualification in the paper, so they do not cause any problems for the estimation.

⁴ The public sector dummy is included to control for any sectoral differences in the use of vocational qualifications, though it could be argued to be potentially endogenous, as an outcome of qualification acquisition. We experimented with leaving this variable out of the estimated wage equation, but in fact it made no difference to the estimated results, which changed in all cases by extremely small amounts (results available from the authors on request).

3. Methodology

The estimated returns are derived from wage equations, estimated by OLS, including the qualification variables as dummy variables

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

where $\ln W_i$ is the natural log of the real hourly wage of individual i , Q_{ji} is a dummy variable to indicate whether qualification j is held by individual i , X_i is a vector of other control variables, and ε_i is a disturbance term.

3.1 Endogeneity

The principal econometric issue with estimating the above equation is endogeneity of the qualification variables. It is not random who obtains a vocational qualification and who does not, and if the characteristics of the individuals associated with selection into vocational education and training also affect the wages earned, then this will produce biased estimates of the δ coefficients, if such characteristics are not controlled for. Those individuals who choose to take vocational qualifications, particularly low level qualifications and particularly when taken after the completion of full-time education and when already in the labour market, may have unobserved characteristics that are associated with lower wages. The argument is that if they were earning well in the labour market, then they would not choose to return to education to obtain a low level vocational qualification. There are various econometric techniques that can be used to allow for such issues, such as using longitudinal data to include a fixed effect for each individual which controls for time-invariant unobserved characteristics, or using an instrumental variable that isolates exogenous variation in the receipt of vocational qualifications. Neither can be used in the current case with the LFS data, however. While the LFS does have a longitudinal element over five quarters, too few adults are observed acquiring a vocational qualification during their year in the survey to provide sufficient variation. Also, given the wide range of qualifications considered here, no single instrument is available in the LFS with which to perform IV analysis. All we do in the present paper to allow for potential endogeneity is to choose specific control groups in places, to make the treatment and control groups as similar as possible. This is the approach that has typically been used in this literature that uses survey data, for example Dearden *et al.* (2000), Dearden *et al.* (2004), Dickerson and Vignoles (2007) and Jenkins *et al.* (2007).

Note that the analysis of administrative data, which compares the wages of achievers and non-achievers on the same qualification, avoids this problem of selection onto the vocational course, since all individuals, in both treatment and control groups, chose to enrol onto the same course. However, such an analysis introduces a new endogeneity, to the extent that it is not random who completes a course and who does not. In the absence of randomisation and a natural experiment, there is always likely to be a selection problem in observed data. When we move on in later reports to comparing the survey and administrative data results, we will compare these two separate selection biases. For now, we simply report the results in the LFS, acknowledging the potential for bias.

3.2 Qualification Variables

As explained in the data section, the LFS reports all qualifications held by an individual. Two approaches have been adopted previously in the literature to make use of this information: the ‘highest qualification’ and ‘all qualifications’ approaches. In the former, only individual i ’s highest qualification is identified in the estimated equation. Only one of the qualification dummy variables therefore takes the value of one for each individual, and so the qualification dummies are mutually exclusive for a particular individual. The interpretation of their coefficients is therefore relative to an omitted category. In the base specification, this omitted category will be individuals with no qualifications, though subsequent analysis will vary the omitted category to provide alternative comparisons. The use of the highest qualification specification produces what are known as marginal returns. These measure the gain in wages from just reaching a new highest qualification level.

The alternative is to include all qualifications held by the individual into the equation. This would mean that the qualification variables were no longer mutually exclusive, so it would not be the case that all were interpreted relative to the same reference category. Rather each would be interpreted, relative to its own zero category, i.e. the comparison would be between those with the qualification and those without (holding constant all other qualifications held). In essence, we are saying: ‘take two people with the same list of qualifications, except in addition person 1 has qualification X, while person 2 does not. What is the average difference in their wages?’ This estimate is usually called the average return, since it is measured across all individuals who hold the qualification, and not just who hold it as their highest.

The distinction between marginal and average was first introduced by Dearden et al. (2000), and has been repeated in most survey-based analyses of returns presented since (for example, Jenkins et al., 2007, and BIS, 2011). There is no consensus about which wage return, marginal or average, is the most appropriate, and each has its place, depending on the research question being asked. The average return may seem the more appropriate at first glance, since it takes into account the wages of all individuals who hold that qualification, and not just those individuals who have reached that qualification but decided to go no further, who could be quite a select sub-sample of all with the qualification.⁵ An additional advantage of the average returns specification is that it avoids the necessity of ranking qualifications to determine which are the higher, which can be decided quite arbitrarily in some cases, amongst qualifications at the same level.⁶ On the other hand, the average returns specification compares all individuals with a qualification to all without (holding constant the other qualifications controlled for in the equation) so some in the comparison group will be higher qualified while others will be lower qualified. This makes it more difficult to interpret the results. With the highest qualification specification, individuals with a particular qualification are always compared to others at a lower level. In addition, by carefully choosing the sample, that comparison group can be any lower qualified group we want. Thus we can estimate the marginal wage return to a qualification amongst people who have just reached a particular level with that qualification, relative to others who have remained one qualification level below, which is often the research question to which policy-makers want to know the answer. In this report, we therefore present both marginal and average estimated returns, so that the readers can use whichever results they prefer.

3.3 Extensions

We extend the previous analysis of returns to qualifications that has been undertaken using LFS data in a number of ways.⁷ First, we perform checks to determine the robustness of the results to variation in how we measure all qualifications held, and the order in which qualifications are ranked to determine the highest qualification.

⁵ A levels are probably the best known example here. A large majority of individuals who obtain A levels go on to study at university and acquire a degree. Those who have A levels as their highest qualification are therefore quite a select group, and probably not typical of the average A level holder.

⁶ In the results section, we discuss the robustness of the marginal returns results to changes in the assumed ranking of qualifications when determining highest qualification.

⁷ See for example Dearden *et al.* (2000), Dearden *et al.* (2004), Dickerson and Vignoles (2007), Jenkins *et al.* (2007) and McIntosh (2006).

Second, we perform quantile regression analysis to determine the wage premiums associated with vocational qualifications throughout the conditional wage distribution, rather than just at the mean of the distribution. We report the conditional difference in wages between individuals with and without each qualification of interest, at the 10th, 25th, 50th, 75th and 90th percentiles of their respective wage distributions. We do not have any strong priors about the quantile results, though one proposition could be that vocational qualifications are of more benefit to those individuals whose characteristics place them lower in the wage distribution.

The final extension is to consider the subject area of the qualification in addition to its type and level. The analysis is undertaken within a marginal returns framework, so that the individual's subject area is represented by that of their highest qualification, rather than considering all qualifications, which may be in varying subjects that would complicate the interpretation of the results. In effect, therefore, a separate dummy variable is introduced for each qualification defined by a type/level/subject combination (rather than by just type and level as previously) and when held as a highest qualification.

One issue with the subject specific returns is that they will be greatly affected by the occupation to which they lead. For example, the returns to an engineering qualification would be expected to be higher than the returns to a hairdressing qualification of the same type and level, since the former leads to a typically higher-paying occupation. For a young person making decisions about their future career, such information is exactly what they would wish to know. It is therefore important to present such information as our main subject-based results. On the other hand, for an individual already working in hairdressing, their post-qualification wages relative to those of engineers would be irrelevant to them. What such individuals would want to know is the wage premium to obtaining a qualification, relative to the status quo of remaining in the same position without that qualification. We therefore also present results that are conditional on the occupation worked in. Specifically, 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 can be interpreted as the return to that qualification if the individual works in a non-relevant occupation. The coefficient on the interaction term then 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

4.1 Base Specifications

The base results are presented in Table 2. In this table we present both average and marginal returns, in each case for all workers and then for males and females separately. In all equations we also control for academic qualifications held, as well as other individual and job characteristics (age, age squared, ethnicity, public sector worker and full time status, as well as gender in the pooled models). The numbers reported in Table 2 are the estimated percentage wage premiums, that is, the exponential of the coefficients from the logarithmic wage equation, presented in percentage terms. The results are ordered by qualification type, and then by level within qualification type.

At the foot of Table 2, the estimated returns to academic qualifications are also presented, for the purposes of comparison. Note that there is no reason to expect the vocational qualifications to achieve similar returns to the academic qualifications at the same level, the ‘parity of esteem’ debate now having been mostly discontinued. Academic and vocational qualifications are different qualifications, often with different entry qualifications, and attracting people from different parts of the ability distribution.

Considering the average returns first, recall that this specification observes *all* qualifications held by the individual, so that the qualification dummy variables are not mutually exclusive, and their coefficients are each interpreted relative to their own zero category. Thus, for example, the wage premium reported in the first row of column 1 suggests that individuals with an HNC/HND qualification earn, on average, 13.2% more than individuals without an HNC/HND, holding constant other qualifications held and the other characteristics that were included. This is a large wage premium, and indeed is the largest in the first column of results. HNC/HND qualifications are the highest ranked BTEC qualification, and this finding represents a general pattern in the table, that higher ranked qualifications have higher average returns than lower ranked qualification in the same category. Note that this is not automatic and does not need to be the case, since each is measured relative to its own reference category, rather than a common reference at a given

level in the qualification hierarchy. The larger returns to higher level qualifications are therefore likely to reflect the greater value placed on the higher level of skills in the labour market, and also the often longer duration of higher level qualifications.

As well as variation in returns across levels, the results in Table 2 also reveal variation in returns within levels, across qualification types. Another general pattern across all the results in Table 2 is that the returns to BTEC qualifications are higher than the returns to other qualifications at the same level. This is not unexpected, given that BTECs typically have the longest duration of the different categories, and provide a more general, college-based training programme.⁸ Thus, in addition to the level 4 result for HNC/HND mentioned above, the level 3 qualification with the highest return is the BTEC ONC/OND (6.9%). The latter result is not too dissimilar from the returns earned by studying for two years for academic qualifications at Level 3 (the return to A levels being 8.6%). At level 2 and below, no qualification other than BTEC earn a positive and statistically significant return, whereas for BTEC first diplomas and certificates, the returns are a statistically significant 1.3-2.3%.

For all other low level (i.e. levels 1 or 2) vocational qualifications, the estimated wage return is either insignificantly different from zero, or in a number of cases is actually negative and statistically significant. For example, taken at face value, the results suggest that individuals holding an NVQ2 qualification earn 7.4% less on average than individuals who do not hold such a qualification, holding constant all other qualifications held. On the face of it, there is a wage *penalty* to obtaining an NVQ2 qualification. A potential explanation is that the observed negative coefficient is due to unobserved differences between individuals with and without an NVQ2 qualification, with the holding of such a qualification being associated with characteristics that reduce wages on average. Thus, such coefficients are likely biased downwards, due to the endogeneity or selectivity effects associated with individuals who acquire such qualifications, as discussed in Section 3.1 on endogeneity above. Such negative selectivity could exist for any vocational qualification, of course, but when the ‘true’ returns are likely to be small anyway, as for the low level NVQs, this negative selectivity can take the estimated returns into negative territory.

Columns 2 and 3 in Table 2 present the estimated average returns separately for men and women, demonstrating that there are clear differences by gender. For the highest-earning qualifications, the BTEC qualifications at Levels 3 and 4 (ONC/OND and HNC/HND), the

⁸ See the descriptions of the various qualifications types in Section 2 above.

estimated wage premium is statistically significantly larger for men than for women, HNC/HND associated with 14.9% higher wages for men but 8.7% higher wages for women, for example, relative to individuals without such a qualification but with the same list of other qualifications.

In other differences between the genders, the significant average 5.1% returns to Advanced Craft City and Guilds qualifications accrue to males only, whereas the benefits of higher level RSA qualifications are received by females only (7.6-9.6%). Such differences reflect the typical areas of the two groups of qualifications and the jobs to which they lead, with the former developing skilled manual skills in particular, while the latter relate to administrative skills. Considering apprenticeships at the foot of the table, the significant positive returns (8.4%) are earned by males only. While apprenticeships are also viewed as typically male dominated in their traditional sectors of manufacturing and construction, in fact most of the recent growth in apprenticeship numbers has been in female-dominated areas (Health, public service and care) or occupations with similar numbers of men and women (Business, administration and law).⁹ It will be interesting to see whether female returns to apprenticeships begin to rise amongst more recent apprentices. Finally, looking at the NVQ and GNVQ qualifications, there are no significant differences in average returns between the genders, with the exception of level 3 NVQ where males earn a 2.5% premium, while for females the magnitude of the premium is similar but negative and statistically significant.

Columns 4-6 in Table 2 report the marginal returns to holding each qualification as a highest qualification, for all individuals, men and women respectively. Since the qualification variables are now mutually exclusive, all returns are interpreted relative to the reference category, which in Table 2 is individuals with no qualifications at all. Given this reference category, the estimated marginal returns are as expected much larger than the average returns in the first three columns. The pattern of results is, however, very similar. Within qualification types, the highest returns go to qualifications at higher levels, which is as expected in this case, since all are being measured relative to the same unqualified reference group. Within levels, the highest returns again go to the BTEC qualifications. The highest marginal return in the table is therefore to HNC/HND qualifications, the holders of which earn 58% more than unqualified individuals, on average, when held as a highest qualification.

⁹ See *Apprenticeship Statistics: England (1996-2015)*. House of Commons briefing paper 06113, January 2015. <http://researchbriefings.files.parliament.uk/documents/SN06113/SN06113.pdf>

Comparing male and female marginal returns, the pattern is again the same as the average returns, in terms of which type of qualification yields the highest return for which gender.

The estimated returns in Table 2 are qualitatively very similar to previous estimates of returns to vocational qualifications made with the LFS, going back to Dearden et al. (2000), and updated in Dearden et al. (2004), McIntosh (2006), Jenkins et al. (2007) and BIS (2011). There is therefore no evidence for any substantial shift in returns to vocational qualifications over time.

Table 3 reports the same marginal returns specification for all workers as Table 2 column 4, but disaggregates the findings by region, dividing the UK into its four constituent countries, and further dividing England into the four regions of North and Midlands, South-West, South-East and London. Overall, there is no strong pattern in Table 3, with no region or country consistently seeing higher or lower returns to vocational qualifications. There are perhaps slightly lower returns in South-West England to some of the key qualifications, such as BTECs, apprenticeships and City and Guilds Craft (Level 2), though none of the differences, with the exception of the last, are statistically significant.

It could be argued that the marginal returns in Table 2 are not too interesting, particularly for the higher level qualifications, measured as they are relative to individuals with no qualifications. Someone thinking of doing a BTEC ONC/OND qualification, for example, is probably less interested in the fact that on average holders of such qualification earn 41% more than individuals with no qualifications, and is more interested in how much they would earn relative to someone whose highest qualification is at Level 2, which presumably the person considering the BTEC already holds if they are thinking of moving to Level 3. One of the advantages of the highest qualification specification is that the sample can be chosen so that the comparison group is whoever we want. We therefore estimated a series of additional highest qualification equations, each of which covered two levels on the qualification hierarchy, for example levels 2 and 3. In this example, dummy variables for each of the vocational qualifications at Level 3 are included, to indicate individuals who hold such qualifications as their highest qualification. The reference category in this case is therefore those whose highest qualification is at Level 2. The interpretation of the coefficients on the included variables is therefore the wage premium to holding the respective qualification as a highest qualification, relative to remaining qualified to Level 2 only. This is probably the closest estimate to what policy-makers want to know, in terms of the

additional benefit to moving an individual one step up the qualification hierarchy. In further specifications, we can limit the sample further, so that the comparison group is not all individuals who have reached Level 2, but rather all individuals who have achieved Level 2 via the academic route (i.e. 5+ good GCSEs)¹⁰, or all individuals who have reached Level 2 via vocational qualifications only. The last estimate in particular is of interest, in that it compares ‘the sort of people’ who enrol for a Level 3 vocational qualification to ‘the sort of people’ who enrol for a Level 2 vocational qualification, and therefore removes some of the selectivity issues of people selecting into vocational education (though there are clearly still selectivity issues in terms of level reached). For all of the reasons discussed in this paragraph, these specific comparison group estimates are probably the preferred results of most policy relevance in the paper.

The results from this analysis are presented in Tables 4, 5 and 6, for qualifications at Level 4+, 3 and 2 respectively. Looking first at Table 4, the results reveal that individuals who reach Level 4+ via vocational qualifications earns significantly more, on average, than those individuals whose highest qualification remains at Level 3. This is the case for BTEC HNC/HND qualifications (14%), NVQ4 (10.7%) and NVQ5 (9.9%) qualifications. Thus progressing from Level 3 to Level 4+ via vocational qualifications is associated with a significant gain in wages. This is the case whether the comparison group reached Level 3 via academic or vocational qualifications, though the premium is larger in the latter case. Thus, for an example, individuals with an HNC/HND qualification as their highest qualification earn on average 7% more than someone with two or more A levels as their highest qualification. Even when successfully on the academic track therefore, acquiring a vocational qualification at a higher level is associated with higher wages. For individuals who reached Level 3 via vocational qualifications, then the payoff to acquiring an HNC/HND is significantly higher, at 19.3%. Similar patterns are observed for the other qualifications, with a small (2.8-3.4%) gain to acquiring an NVQ 4 or 5, relative to having at best two or more A levels, but a substantially larger gain when individuals upgrade their vocational qualifications via such routes. The exception to this pattern is the higher level RSA qualifications, which are not associated with higher wages for A level-qualified individuals, and only yield a positive premium relative to Level 3 vocational qualifications. Comparing the genders, the

¹⁰ Having achieved such GCSEs, an individual wishing to move to vocational education would in most cases be eligible for direct entry to a Level 3 qualification. This would particularly be the case amongst school leavers who complete lower secondary school at age 16 with good GCSEs, but who choose to do a vocational rather than academic course in upper secondary education, who would move straight to a Level 3 in a Further Education college.

wage premium associated with Level 3 to Level 4 progression is higher for men with respect to BTEC qualifications, but higher for women for the other qualification types.

A similar analysis is undertaken in Table 5, where individuals holding a Level 3 vocational qualification as their highest qualification are compared to various comparison groups qualified at best to Level 2. Very similar patterns to Table 4 are observed. Hence, all vocational qualifications at Level 3 are associated with significantly higher wages than Level 2 qualifications, so that the step up the qualification hierarchy via the vocational route does yield a payoff. As usual, this gain is largest for holders of BTEC qualifications, amongst the qualification types (24%), and smallest for NVQ3 qualifications (12.7%). When compared to those who reached Level 2 specifically via the vocational route, then the premiums associated with all qualification types are large, ranging from 29% for BTEC ONC/OND qualifications, to 17.4% for NVQ3s. On an exclusively vocational progression route, there is therefore a significant step up in value of qualifications, associated with moving from Level 2 to Level 3. Compared to individuals who reached Level 2 via academic qualifications (5+ good GCSEs), then some Level 3 vocational qualifications can still represent a good investment, in particular BTEC ONC/OND (14.3%), City and Guilds Advanced Craft (6.6%) and GNVQ advanced (10.6%). There is a different pattern in terms of the gender split, compared to Table 4, whereby at Level 3 the returns are higher for men than for women for every qualification type except RSA.

Finally in this section, Table 6 looks at Level 2 vocational qualifications relative to specific Level 1 comparison groups. Compared to Level 1 qualifications, BTEC, City and Guilds and RSA qualifications are associated with higher wages, though only the last of these achieves a return in double figures. There is therefore little increase in value between Levels 1 and 2 on the vocational qualification hierarchy. For NVQ qualifications, Level 2 is apparently associated with lower wages even when compared to only vocational Level 1 qualifications. Note that the Level 2 returns are similar whether compared to academic or to vocational comparison groups, contrary to the findings in Tables 4 and 5, where the returns were lower when the comparison group was academic qualifications at the lower level. It therefore appears that low level GCSEs attract little value in the labour market, and even Level 2 vocational qualifications are seen as an upgrade relative to them.

Some of the results from Tables 4-6 are illustrated in Figures 1-3, for all workers, males, and females respectively. In particular, these figures show the *cumulative* gains from

acquiring vocational qualifications at successively higher levels. They therefore use the results from the middle columns of Tables 4-6 relative to vocational qualifications at the previous level. For example, a Level 2 BTEC qualification adds 8.3% to wages relative to vocational Level 1 qualifications (Table 6), then a Level 3 BTEC qualification adds a further 28.8% on top of vocational Level 2 (Table 5), and a Level 4 BTEC qualification adds a further 19.3% on top of vocational Level 3 (Table 4). The figures show that, for all workers and for males and females separately, the returns gradient is actually quite similar for each type of vocational qualification. The fact that BTECs achieve the highest cumulative returns across all levels is therefore due to their ‘head start’ of achieving respectable returns even at Level 2.

4.2 Robustness Checks for Base Specifications

We performed two robustness checks, one each for the average and marginal returns, to determine the impact on the results of how the qualifications variables are treated.

With respect to the average returns specification, recall that such a specification should include *all* qualifications held by the individual. However, prior to 2011, the LFS asked respondents to report all *categories* of qualifications that they hold, but only their highest qualification within categories, so that if respondents held more than one qualification in the same category, then not all would be observed. As discussed in the Data section (Section 2) above, we therefore made assumptions about the qualifications that an individual must hold, based on the assumption that they hold the qualifying qualification to be able to move to the next level. Following the change in the 2011 LFS questionnaire to include all qualification held, even when of the same type at different levels, we can test the validity of our assumptions. We therefore re-estimated the average returns equation presented in Table 2 above, making the same assumptions about lower qualifications held within categories, but now estimated only for the period 2011-2015. The same equations were then re-estimated, using the actual information on all qualifications held, available in the LFS for that period. The results, available from the authors on request, show very little difference between the two sets of equations. Where differences do exist, they are only small in magnitude, and are found on lower level qualifications, where the estimated average returns are not as negative. This is to be expected, since any differences between specifications in qualifications allocated to individuals, will be in terms of low level qualifications being observed as held by individuals with higher qualifications in the same category (and therefore presumably higher ability

individuals), in the equations when all qualifications are observed. We are therefore confident that our assumptions about lower level qualifications held, did not affect the full period results presented in Table 2.

For the marginal returns specifications, the check we made was in terms of the ordering of qualifications. When only highest qualification is included in the estimated equation, the ordering of the qualifications can make a difference to which is deemed to be an individual's highest, when that individual holds more than one qualification at the same level. The LFS derived highest qualification variable, *hiqual*, has NVQ qualifications as the highest within each level, and GCSE A*-C as the lowest qualification within Level 2. Thus, an individual holding A levels and an NVQ3 qualification would have the latter recorded as their highest qualification. Similarly, an individual with 5 or more A*-C GCSEs and *any* Level 2 vocational qualification would have the latter as their highest qualification. An obvious alternative way to rank qualifications would be to have the academic qualifications ranked as the highest within each level. This is the ordering we have used throughout. We estimated the marginal returns specifications in Table 2 using this ordering and compared with the LFS ordering of qualifications to examine the sensitivity of our results to the within-level ordering of qualifications. The results (again available from the authors on request), showed that the re-ordering made virtually no difference to the estimated returns. For most qualifications, the returns were almost identical, with the only exceptions being low level (Levels 1 and 2) NVQ and GNVQs, where the estimated marginal return fell somewhat following the re-ordering. This is as would be expected, since these qualifications were previously ranked the highest within levels, and so in the original ordering there was a possibility that some individuals identified with such qualifications as their highest would also have other (e.g. academic) qualifications at the same level, which could increase their earnings. The fact that, overall, the ordering of qualifications for the highest qualification specification makes virtually no difference to the results suggests that few individuals hold multiple qualifications at the same level.

4.3 Quantile Regressions

So far, all of the results have been in terms of average wages differences between individuals with and without vocational qualifications, i.e. evaluated at the mean of the distribution. However, we can look at the difference in wages at any point in the wage distribution (conditional on observed characteristics). This is done by estimating quantile regression

equations. These can be used to evaluate the impact of vocational qualification on wages, measured at particular percentile points. In other words, there is a (conditional) wage distribution for those with a particular vocational qualification as their highest, and a (conditional) wage distribution for individuals with no qualifications, as the reference category. The quantile regression results show us the difference between these two distributions, at each point in the distributions. Figure 4 illustrates the quantile regression results at all points in the distribution, for different qualifications separately in different diagrams.

The results show that the pattern of returns across qualifications observed previously at the mean holds in the quantile regressions too. At each percentile, marginal returns are higher for higher level qualifications, and within levels, returns are highest for BTEC qualifications and lowest for NVQ qualifications. Thus, the highest marginal returns, at all percentiles, are to HNC/HND qualifications. Figure 4 makes clear that for many of the vocational qualifications considered, the returns increase in size as we move up the wage distribution, until in many cases a slight fall in returns at the very top of the wage distribution. This can clearly be seen, for example for the Level 3 and 4 BTEC qualifications (ONC/OND and HNC/HND) where the returns increase steeply at higher percentiles of the distribution, before falling again, though only slightly, at the very top end of the distribution. Other qualifications displaying a similar pattern are mostly Level 3+ qualifications. For such vocational qualifications, therefore, there is no evidence that they benefit primarily those with low ability (assumed to be at the lower end of the wage distribution), or that they are substitutes for high natural ability. In fact, they can be seen as complementary to ability, with the more able getting more out of them in terms of increasing their labour market value. The situation is the same for apprenticeships.

For the lower level vocational qualifications, there is less evidence that they are complementary to ability, with the estimated marginal returns being largely flat across the wage distribution. With the lower level RSA and NVQ qualifications, there is a downward slope to the returns across the wage distribution, so that the lowest returns are clearly earned at the top end of the wage distribution. This would suggest that such qualifications do yield some value to those individuals, presumably of lower ability, who are not performing well in the labour market. For those individuals already more successful in the labour market, acquiring such qualifications yields no additional value.

4.4 Returns by Subject Area

The final piece of analysis takes into account the subject area of the vocational qualification. Subjects are grouped into 13 broad categories,¹¹ with a 14th named ‘other’ collecting up remaining categories that had too few observations to be analysed in isolation. We analyse subjects separately by qualification type and level, so that the previous single dummy variable for a particular type/level qualification is effectively split into a series of dummies for each subject. Note, however, that not all subject areas are offered by each qualification type. The equations are estimated in a ‘highest qualification’ framework, with the reference category being individuals with no qualifications. The results are illustrated in the various diagrams of Figure 5.

It is clear that, even within qualification type and level, there is substantial heterogeneity in estimated returns across subject areas. For most qualifications and levels, the subject areas associated with the highest returns are Engineering, Construction, Management and Business. At the other end of the scale, returns are much lower for subject areas such as Caring, Childcare and Catering, and in the case of some qualifications, also for Retail and Manufacturing. Thus, considering for example a qualification with a high marginal return when averaged across all subjects, such as a Level 3 BTEC qualifications, when we disaggregate by subject we observe that such high returns are not observed universally across subjects. While subjects such as Engineering, Construction and Business each enjoy a wage premium of 30%+ relative to individuals with no qualifications, even a well-regarded qualification such as this produces insignificantly different from zero wage returns in the subject areas of Retail, Manufacturing, Caring, Social Services and Hair & Beauty. On the other hand, taking a qualification that had a much smaller marginal return, and negative estimated average returns in Table 2, such as NVQ Level 2, can still produce quite healthy returns in particular subject areas, such as Management, Secretarial and Business, which are all associated with marginal returns of around 10%, relative to individuals with no qualifications. In other subject areas, however, even the marginal returns are apparently negative and significant, such as Caring, Childcare and Catering.

As discussed in the Methodology section earlier, one issue with such subject-specific returns is that they reflect, to a large extent, the wages in the occupations to which they lead. Engineers are paid more, on average, than care assistants, so that we would expect the wage

¹¹ The 13 categories are Retail, Management, Secretarial, Business, Computing, Engineering, Manufacturing, Construction, Caring, Childcare, Social Services, Catering and Hair & Beauty.

premium over unqualified workers to be higher for those with an Engineering qualification than for those with a Caring qualification. For a young person looking to choose a career, and the qualifications needed to achieve it, this information is exactly what they need to know. The information above is therefore our main subject-specific results. For others, however, such comparisons are not useful. They want to know, within their chosen profession, whether it is worth them becoming more qualified. The appropriate comparison in this case would be with less qualified individuals within the same occupation. This is what we do in our final piece of analysis. Rather than consider every possible combination of qualification and occupation, many of which would be empty cells, we estimate a more parsimonious specification, in which each qualification dummy (identifying type and level held as a highest qualification) is interacted with a dummy variable indicating whether the individual is in the ‘appropriate’ occupation for that qualification (i.e. someone with an engineering qualification working in an engineering occupation, for example).

The results are illustrated in the various diagrams of Figure 6. In these diagrams, the green lines show the point estimates and confidence intervals for the base, while the red lines show the same for the total effects (base+interaction) when the qualification-subject is in the appropriate occupation. The latter effect is the *total* return to holding that qualification in the appropriate occupation, and hence indicates the wage premium relative to the control group of unqualified individuals *within the same occupation*.

The results show that estimating returns by comparing to lower qualified individuals within the same occupation makes a big difference to the estimated returns in some subject areas. In particular, the returns to caring, childcare and catering qualifications are in many cases significantly higher when compared to less well qualified individuals working in the same occupation, than when compared to a general low-qualified comparison group. For example, individuals with an NVQ Level 2 qualification in each of these areas are observed to earn significantly less, on average, than a general comparison group of unqualified individuals. However, when compared to individuals with no qualifications working in the same area, then all three are associated with significantly higher wages. Similar effects are observed for Level 3 vocational qualifications in these service sector areas, when comparing to individuals either with no qualifications, or with Level 2 qualifications as their highest.

Finally while discussing subjects of qualifications, we can return to the male-female differences in the returns to some vocational qualifications, observed earlier in Table 2. One

potential explanation for the higher returns to some qualifications observed for males could be if men are more likely to take qualifications in the higher earning subjects. The raw statistics seem to confirm this possibility. For example, at Level 2, 96% of Engineering and 98% of Construction qualifications are held by males, while 95% of Childcare and 95% of Hairdressing qualifications are held by women. The same very high percentages are observed at Level 3. We would therefore expect that controlling for subject would narrow the returns gap between men and women for certain qualifications, and this is exactly what we do observe, as reported in Table 7.¹² Thus for example, the large difference in estimated returns to BTEC ONC/OND (Level 3) qualifications and to NVQ3 qualifications between men and women are completely closed once we control for subject, while the male advantage in returns to City and Guilds qualifications at Levels 2 and 3 is reduced to a large extent.

5. Conclusions

This report has used 18 years' worth of Labour Force Survey (LFS) data, from 1997-2015, to estimate the wage premiums associated with holding a variety of vocational qualifications, differentiated by type and level, and in some cases by subject as well.

The main message delivered by the results is that there is a wide range of wage premiums associated with vocational qualifications in the UK. Whilst this perhaps should not be a surprise, given the wide range of qualifications themselves, it does mean that blanket statement such as 'vocational qualifications all earn low or no wage returns' are not appropriate.

The wage returns differ by level of qualification. Since each level achieved is expected to add to a learner's wages, then it should not come as a surprise that the marginal returns to vocational qualifications held as highest qualifications are larger at higher levels, relative to individuals with no qualifications at all. However, it is also the case that the average returns to higher level vocational qualifications are greater than to the lower level qualifications, so that each level seems to add more to earnings than the previous level (i.e. increasing returns to levels). Indeed, with the exception of BTEC qualifications, there is little evidence of any returns, on average, to vocational qualifications at Levels 1 and 2. It is such findings, at such

¹² Note that the reported returns without subjects in Table 7 do not match the earlier ones shown in Table 2, since the sample in all columns in Table 7 is restricted to the period 2004-2015. These are the years of the LFS for which we have subject information.

levels, that commentators no doubt have in mind when they talk about the low value of vocational qualifications. Note, however, that even when the wage returns are insignificantly different from zero, such low level qualifications may still have value in terms of getting the individual into employment, i.e. the value may be the job itself, rather than the wage received in the job.

There is also variation in estimated returns within levels. BTEC qualifications are consistently associated with higher returns within each level than the other qualification types, with NVQs typically receiving the lowest returns. BTEC qualifications therefore offer a model for high quality vocational provision. Similarly, apprenticeships are associated with very similar levels of returns to Level 3 BTECs (ONC/OND), and so are also examples of high value provision.

The quantile regressions demonstrate that the estimated returns also differ with the unobserved characteristics of workers and their jobs, across the wage distribution. It is not at the lower end of the wage distribution, amongst individuals with otherwise lower wage-earning potential, that vocational qualifications have their highest value, however. Rather, for most vocational qualifications, the estimated returns increase in size as we move up the wage distribution, at least until the very top end of the wage distribution is reached.

Finally, with respect to subject of study, there is yet again much variation in the estimated returns to vocational qualifications, with subjects such as engineering and construction consistently being associated with the highest returns, while subjects leading to service sector occupations, such as caring, childcare and hospitality/catering are typically associated with much smaller returns. The latter finding is, to a large extent, determined by the wage levels within occupations to which qualifications lead, however. When we look within occupations, the majority of vocational qualifications are associated with higher wages compared to lower qualified individuals in the same occupation.

As stated in the introduction, this paper is the first to be released as part of an overall project on the returns to vocational education. Where, then, does the project go next? The key issue to be addressed is the selectivity of who holds vocational qualifications. There are a number of different aspects to this. One is selectivity onto vocational courses in the first place, which could reflect both positive and negative wage-influencing characteristics of individuals. On the positive side, those who enrol for vocational education or training may be more motivated or have more ambition, relative to those who do not. On the other hand,

registering for vocational qualifications, particularly low level vocational qualifications, may signal unobserved characteristics associated with less successful labour market outcomes. In addition, it may be the more able who complete a course and obtain a qualification. Thus, the estimated coefficients on the qualification variables could be biased upwards or downwards, and the relative biases will likely differ in different circumstances. For example, when estimating average returns, comparing those holding a particular vocational qualification to all those who do not, then the negative bias associated with the sort of individuals who choose (particularly low level) vocational qualifications may dominate. On the other hand, when we restrict comparison groups, for example to only those with no qualifications, or to those in the same (particularly low-paying) occupations, then the motivation and ability biases may dominate, biasing the estimated returns upwards.

In future work on this project, we intend to use the merged administrative data sets to further investigate these issues. Previous work with these data in the literature has, out of necessity, compared learners who achieve a qualification to non-achievers doing the same qualification. This comparison solves the selectivity problem onto the qualification in the first place, though it is still likely to be non-random who completes or who does not. The forthcoming ‘all education’ dataset, which will match the school-level National Pupil Database (NPD) to the ILR and hence onto HMRC tax and benefit records, will help in this regard. Firstly, the merged dataset will include non-learners in FE as well as learners, so we will not have to rely upon non-achieving FE learners to form the comparison group. Secondly, and most importantly however, the NPD will provide the history of childhood test scores at the various key stages, and so allow us to go much further than previously possible in controlling for differences in the educational background (and hence to a certain extent ability and motivation etc) between the treatment and control groups of learners and non-learners. When such research is complete, the results will be compared with the first results of the project, as presented in this report, to determine the extent to which simple estimates using survey data can produce accurate results.

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Table 1: Number and Proportion of Vocational Qualification Holders

	All	By Gender		By Year		
	(1)	(2)	(3)	(4)	(5)	(6)
		Male	Female	1997	2006	2015
	sum/	sum/	sum/	sum/	sum/	sum/
	mean	mean	mean	mean	mean	mean
NVQ-5	1262	674	588	34	76	120
	0.002	0.002	0.002	0.001	0.002	0.003
NVQ-4	5093	2058	3035	99	320	427
	0.006	0.005	0.008	0.002	0.007	0.012
NVQ-3	30624	11445	19179	471	1843	2404
	0.039	0.028	0.050	0.009	0.042	0.069
NVQ-2	35179	13898	21281	945	2092	2207
	0.044	0.034	0.056	0.018	0.047	0.064
NVQ-1	8044	3603	4441	320	436	394
	0.010	0.009	0.012	0.006	0.010	0.011
GNVQ Advanced	5237	2356	2881	92	354	289
	0.007	0.006	0.008	0.002	0.008	0.008
GNVQ Intermediate	4073	1929	2144	116	322	183
	0.005	0.005	0.006	0.002	0.007	0.005
GNVQ Foundation	1090	543	547	35	82	37
	0.001	0.001	0.001	0.001	0.002	0.001
RSA Higher Diploma	740	78	662	73	37	23
	0.001	0.000	0.002	0.001	0.001	0.001
RSA Advanced Diploma	1577	141	1436	137	53	89
	0.002	0.000	0.004	0.003	0.001	0.003
RSA Diploma	2196	292	1904	162	122	83
	0.003	0.001	0.005	0.003	0.003	0.002
RSA Other	35807	2708	33099	3665	1782	365

	0.045	0.007	0.087	0.071	0.040	0.011
City & Guilds Advanced Craft	29765	25896	3869	1665	1732	788
	0.037	0.063	0.010	0.032	0.039	0.023
City & Guilds Craft	20955	16045	4910	2045	1097	460
	0.026	0.039	0.013	0.040	0.025	0.013
City & Guilds Foundation	12191	7411	4780	1278	622	202
	0.015	0.018	0.013	0.025	0.014	0.006
BTEC Higher Diploma/HNC/HND	43699	30180	13519	2595	2547	1938
	0.055	0.073	0.035	0.050	0.058	0.056
BTEC National Diploma/ONC/OND	33662	21080	12582	2238	1687	1465
	0.042	0.051	0.033	0.044	0.038	0.042
BTEC First/General Diploma	4120	1909	2211	292	207	306
	0.005	0.005	0.006	0.006	0.005	0.009
BTEC First/General Certificate	2867	1393	1474	265	122	87
	0.004	0.003	0.004	0.005	0.003	0.003
Apprenticeship	84582	73111	11471	7825	4469	2573
	0.107	0.177	0.030	0.152	0.101	0.074
<hr/>						
N	794054	411913	382141	51437	44126	34738
<hr/>						

Table 2 : Hourly Wage Returns to Vocational Qualifications 1997-2015

	Average Returns			Marginal Returns		
	(1) All	(2) Male	(3) Female	(4) All	(5) Male	(6) Female
BTEC Higher Diploma/HNC/HND	13.193*** (0.296)	14.936*** (0.380)	8.722*** (0.460)	57.574*** (0.499)	60.479*** (0.660)	48.426*** (0.758)
BTEC National Diploma/ONC/OND	6.876*** (0.295)	7.844*** (0.392)	4.346*** (0.435)	39.304*** (0.554)	41.574*** (0.767)	34.761*** (0.780)
BTEC First/General Diploma	1.294* (0.717)	2.102* (1.088)	1.257 (0.955)	18.950*** (2.310)	16.038*** (3.610)	21.559*** (2.962)
BTEC First/General Certificate	2.347*** (0.865)	1.137 (1.281)	3.316*** (1.169)	18.797*** (3.855)	22.171*** (5.947)	15.839*** (4.989)
RSA Higher Diploma	4.954*** (1.789)	-2.751 (5.566)	7.740*** (1.915)	34.188*** (2.422)	19.875** (8.883)	36.560*** (2.537)
RSA Advanced Diploma	2.908*** (1.070)	-3.082 (3.541)	5.393*** (1.136)	27.782*** (1.663)	25.214*** (6.729)	29.205*** (1.721)
RSA Diploma	-0.807 (0.975)	-6.873*** (2.641)	1.505 (1.058)	19.166*** (2.417)	19.174** (8.577)	20.567*** (2.515)
RSA Other	-0.187 (0.239)	-5.154*** (0.886)	2.249*** (0.257)	12.923*** (0.674)	6.656** (3.019)	14.822*** (0.703)
City & Guilds Advanced Craft	5.100*** (0.345)	4.982*** (0.383)	-2.972*** (0.753)	30.267*** (0.488)	29.958*** (0.559)	14.499*** (1.122)
City & Guilds Craft	-0.290 (0.351)	0.188 (0.414)	-4.587*** (0.628)	11.454*** (0.893)	11.423*** (1.094)	8.235*** (1.492)
City & Guilds Foundation	-2.997*** (0.411)	-2.606*** (0.556)	-3.942*** (0.590)	4.191*** (1.250)	3.949** (1.642)	2.454 (1.848)
NVQ-5	9.669*** (1.475)	8.282*** (2.034)	12.379*** (2.143)	49.923*** (2.141)	44.760*** (2.910)	55.806*** (3.136)
NVQ-4	9.016*** (0.655)	9.105*** (1.025)	10.364*** (0.858)	50.354*** (0.924)	49.987*** (1.434)	51.091*** (1.206)
NVQ-3	-1.208*** (0.253)	2.509*** (0.439)	-2.495*** (0.307)	26.131*** (0.384)	32.636*** (0.662)	22.100*** (0.461)
NVQ-2	-7.378*** (0.222)	-7.178*** (0.371)	-7.118*** (0.275)	5.361*** (0.402)	5.307*** (0.682)	5.229*** (0.487)
NVQ-1	-9.237*** (0.472)	-10.404*** (0.746)	-7.995*** (0.604)	-1.066 (0.838)	-1.682 (1.393)	-0.674 (1.038)
GNVQ Advanced	3.488*** (0.615)	3.934*** (0.933)	2.719*** (0.804)	35.495*** (1.035)	37.394*** (1.575)	33.131*** (1.352)
GNVQ Intermediate	-0.021 (0.697)	1.566 (1.012)	-1.106 (0.954)	14.834*** (2.052)	18.683*** (2.756)	11.659*** (2.928)
GNVQ Foundation	-4.664*** (1.271)	-4.651** (1.909)	-3.634** (1.698)	3.758 (2.701)	4.225 (3.719)	5.009 (4.111)
Apprenticeship	8.902*** (0.242)	8.439*** (0.281)	-0.053 (0.450)	21.960*** (0.338)	22.374*** (0.422)	9.427*** (0.616)
5+ GCSE Grade A*-C	21.268*** (0.194)	21.600*** (0.295)	20.906*** (0.255)	30.292*** (0.321)	31.714*** (0.527)	29.640*** (0.402)
A Levels	8.568*** (0.216)	8.645*** (0.327)	8.333*** (0.284)	41.885*** (0.371)	43.622*** (0.572)	40.060*** (0.481)
Degree	27.570*** (0.254)	25.738*** (0.368)	29.111*** (0.350)	77.586*** (0.417)	73.426*** (0.600)	80.295*** (0.574)
N	450903	208609	242294	502570	236569	266001

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.

Table 3 : Marginal Returns to Vocational Qualifications by Region

	England				Wales	Scotland	N. Ireland
	(1) Nor	(2) Southwest	(3) Southeast	(4) London	(5)	(6)	(7)
BTEC Higher Diploma/HNC/HND	60.959*** (0.736)	57.536*** (1.856)	60.538*** (1.523)	58.061*** (2.139)	57.909*** (2.249)	49.392*** (1.123)	55.665*** (2.448)
BTEC National Diploma/ONC/OND	40.574*** (0.758)	34.806*** (1.839)	40.826*** (1.549)	40.927*** (2.429)	34.963*** (2.314)	34.162*** (1.638)	41.085*** (3.349)
BTEC First/General Diploma	17.195*** (3.220)	14.847** (7.188)	30.969*** (6.309)	18.064*** (6.550)	10.808 (12.588)	14.548 (9.969)	27.965*** (9.190)
BTEC First/General Certificate	14.447* (7.751)	24.442 (23.385)	20.772* (12.286)	28.132*** (8.575)	5.693 (20.731)	17.063*** (5.618)	41.681** (17.261)
RSA Higher Diploma	34.803*** (3.025)	34.882*** (8.397)	37.335*** (6.044)	41.364*** (11.693)	13.852 (9.933)	15.480 (10.310)	36.654*** (6.775)
RSA Advanced Diploma	25.972*** (2.259)	27.331*** (4.902)	25.404*** (4.024)	50.677*** (7.638)	20.583*** (5.619)	30.389*** (5.902)	30.101*** (8.881)
RSA Diploma	19.835*** (3.493)	18.733** (7.444)	22.365*** (6.001)	21.832*** (6.673)	-2.773 (6.169)	27.345*** (9.214)	5.265 (11.857)
RSA Other	12.494*** (0.884)	12.151*** (2.261)	13.836*** (1.908)	23.359*** (3.418)	8.309*** (2.613)	15.145*** (3.943)	11.034*** (2.340)
City & Guilds Advanced Craft	29.641*** (0.649)	27.208*** (1.519)	28.902*** (1.421)	32.780*** (2.394)	30.027*** (2.148)	35.535*** (1.599)	27.220*** (2.978)
City & Guilds Craft	12.012*** (1.145)	3.457 (2.571)	11.577*** (2.586)	11.280*** (3.796)	11.429*** (4.000)	19.195*** (5.523)	17.499*** (5.835)
City & Guilds Foundation	3.346* (1.750)	1.248 (3.639)	8.691** (3.667)	4.377 (4.008)	5.883 (6.036)	6.194 (6.109)	5.083 (4.134)
NVQ-5	52.741*** (3.214)	47.288*** (6.359)	52.444*** (5.615)	53.391*** (8.966)	47.316*** (8.226)	40.574*** (6.312)	37.399*** (7.506)
NVQ-4	51.336*** (1.230)	48.759*** (2.776)	51.196*** (2.610)	49.237*** (4.649)	45.268*** (3.773)	47.716*** (3.445)	41.182*** (5.844)
NVQ-3	26.001*** (0.500)	22.657*** (1.267)	24.404*** (1.139)	26.920*** (1.891)	26.372*** (1.679)	30.779*** (1.485)	28.513*** (1.906)
NVQ-2	4.838*** (0.505)	5.573*** (1.299)	2.296* (1.268)	6.804*** (1.848)	5.756*** (1.591)	7.232*** (1.925)	12.495*** (2.997)
NVQ-1	-2.724*** (1.043)	-3.502 (2.884)	-2.152 (2.384)	4.262 (3.890)	0.791 (3.528)	2.741 (3.300)	3.978 (6.503)
GNVQ Advanced	34.398*** (1.393)	32.273*** (3.184)	37.224*** (2.703)	41.264*** (3.570)	32.191*** (4.783)	39.054*** (12.647)	34.353*** (4.107)
GNVQ Intermediate	12.008*** (2.975)	15.884** (6.501)	14.714*** (4.107)	20.007*** (5.762)	19.841* (10.919)	27.307 (16.672)	15.538* (8.571)
GNVQ Foundation	2.717 (3.863)	-0.409 (7.940)	6.877 (7.047)	13.743* (7.294)	-4.782 (12.468)	-11.054 (14.763)	11.145 (11.844)
Apprenticeship	21.752*** (0.460)	19.844*** (1.151)	21.156*** (0.985)	24.762*** (1.577)	23.345*** (1.596)	23.223*** (0.977)	17.688*** (1.539)
N	255698	44496	72465	44123	23171	46974	15643

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.

Table 4 : 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	14.020*** (0.351)	15.478*** (0.457)	10.350*** (0.556)	19.253*** (0.388)	20.199*** (0.492)	17.886*** (0.630)	6.975*** (0.383)	8.133*** (0.517)	2.912*** (0.564)
RSA Higher Diploma	0.383 (1.849)	-12.708* (6.520)	3.073 (1.946)	7.050*** (1.983)	-8.791 (6.775)	10.497*** (2.111)	-6.370*** (1.737)	-18.630*** (6.212)	-3.796** (1.823)
NVQ-4	10.679*** (0.684)	8.354*** (1.030)	13.449*** (0.916)	16.725*** (0.735)	12.649*** (1.084)	21.754*** (1.003)	3.384*** (0.668)	2.002** (1.013)	4.712*** (0.888)
NVQ-5	9.895*** (1.597)	4.296** (2.134)	17.284*** (2.374)	15.438*** (1.694)	8.268*** (2.226)	25.863*** (2.569)	2.829* (1.502)	-1.852 (2.032)	8.609*** (2.207)
N	110867	58756	52111	70885	40671	30214	66045	34088	31957

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:

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 5 : Marginal Returns to Level 3 Qualifications

	All Level 2			Level 2 Vocational			5+ GCSE A*-C		
	(1) All	(2) Male	(3) Female	(4) All	(5) Male	(6) Female	(7) All	(8) Male	(9) Female
BTEC National Diploma/ONC/OND	23.973*** (0.567)	27.208*** (0.830)	20.660*** (0.781)	28.845*** (0.629)	31.898*** (0.921)	25.864*** (0.868)	14.324*** (0.682)	16.568*** (1.098)	12.447*** (0.881)
RSA Advanced Diploma	19.387*** (1.631)	15.505** (6.244)	19.823*** (1.697)	24.230*** (1.709)	19.602*** (6.450)	24.442*** (1.780)	10.264*** (1.575)	5.519 (5.676)	11.061*** (1.668)
City & Guilds Advanced Craft	16.971*** (0.546)	18.011*** (0.693)	4.752*** (1.079)	20.179*** (0.593)	21.963*** (0.769)	9.033*** (1.144)	6.607*** (0.671)	7.465*** (0.996)	-3.172*** (1.103)
NVQ-3	12.658*** (0.412)	16.953*** (0.709)	9.761*** (0.496)	17.352*** (0.479)	21.435*** (0.806)	14.307*** (0.582)	4.277*** (0.546)	7.382*** (0.966)	2.348*** (0.652)
GNVQ Advanced	18.423*** (0.973)	20.965*** (1.489)	16.282*** (1.271)	23.669*** (1.053)	26.055*** (1.602)	21.467*** (1.377)	10.577*** (0.992)	12.281*** (1.557)	9.310*** (1.278)
N	62955	31871	31084	56707	29625	27082	51070	26914	24156

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:

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 6: 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	7.753*** (2.154)	2.802 (3.206)	10.930*** (2.797)	8.290*** (2.232)	7.619** (3.519)	9.834*** (2.841)	7.469*** (2.156)	1.911 (3.193)	11.081*** (2.811)
RSA Diploma	10.766*** (2.295)	10.411* (8.262)	11.343*** (2.379)	12.132*** (2.357)	17.185* (8.894)	10.981*** (2.424)	11.793** (2.347)	9.123 (8.159)	13.346** (2.464)
City & Guilds Craft	2.543*** (0.854)	3.306*** (1.066)	-0.405 (1.407)	5.866*** (1.014)	10.779*** (1.505)	-0.716 (1.479)	2.424*** (0.868)	1.795* (1.071)	0.452 (1.440)
NVQ-2	-4.673*** (0.406)	-4.761*** (0.680)	-4.889*** (0.499)	-3.359*** (0.594)	0.899 (1.161)	-5.560*** (0.689)	-4.561*** (0.434)	-5.702*** (0.695)	-4.183*** (0.546)
GNVQ Intermediate	2.378 (1.862)	6.017*** (2.554)	-1.289 (2.640)	0.404 (1.924)	7.912*** (2.862)	-3.764 (2.639)	2.463 (1.866)	5.447** (2.554)	-0.890 (2.645)
N	35997	15313	20684	17817	6424	11393	30065	13846	16219

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 $100 \cdot (\exp(b) - 1)$ 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:

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.

Table 7: Marginal Returns to Vocational Qualifications controlling for Subject

	Level 2 Excl Subjects		Level 2 Incl Subjects		Level 3 Excl Subjects		Level 3 Incl Subjects	
	(1) Male	(2) Female	(3) Male	(4) Female	(5) Male	(6) Female	(7) Male	(8) Female
BTEC First/General Diploma	6.050 (3.951)	13.022*** (3.604)	6.058 (5.440)	9.943** (4.624)				
City & Guilds Craft	11.599*** (1.613)	10.781*** (2.095)	10.770*** (4.120)	10.110*** (3.601)				
NVQ-2	4.237*** (0.822)	2.483*** (0.588)	5.787 (3.665)	0.592 (2.754)				
GNVQ Intermediate	12.640*** (3.768)	10.808*** (3.521)	12.351** (5.687)	7.638* (4.231)				
BTEC National Diploma/ONC/OND					36.571*** (1.065)	31.167*** (1.074)	32.483*** (2.415)	36.940*** (2.284)
City & Guilds Advanced Craft					30.004*** (0.796)	13.517*** (1.507)	25.016*** (2.153)	24.788*** (2.423)
NVQ-3					29.230*** (0.825)	18.759*** (0.603)	28.138*** (2.238)	26.936*** (1.930)
GNVQ Advanced					37.422*** (2.093)	32.909*** (1.895)	35.444*** (2.993)	38.732*** (2.764)
N	15216	17786	15216	17786	26627	27045	26627	27045

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.

Sample for all models includes individuals with no qualifications. In columns (1) to (4) those reporting an NVQ, GNVQ, BTEC, or City & Guilds qualification at level 2 as their highest qualification are also included. In columns (5) to (8) the same respective inclusion criteria are used for level 3 qualifications.

The dependent variable is the log hourly wage. Regressions also include age, age squared, a public sector dummy, full time status, ethnicity, year, and region. Columns (3), (4), (7), and (8) additionally include dummy variables indicating the subject of the vocational qualification irrespective of qualification type.

Figure 1: Marginal Returns relative to Vocational Qualifications at Level One

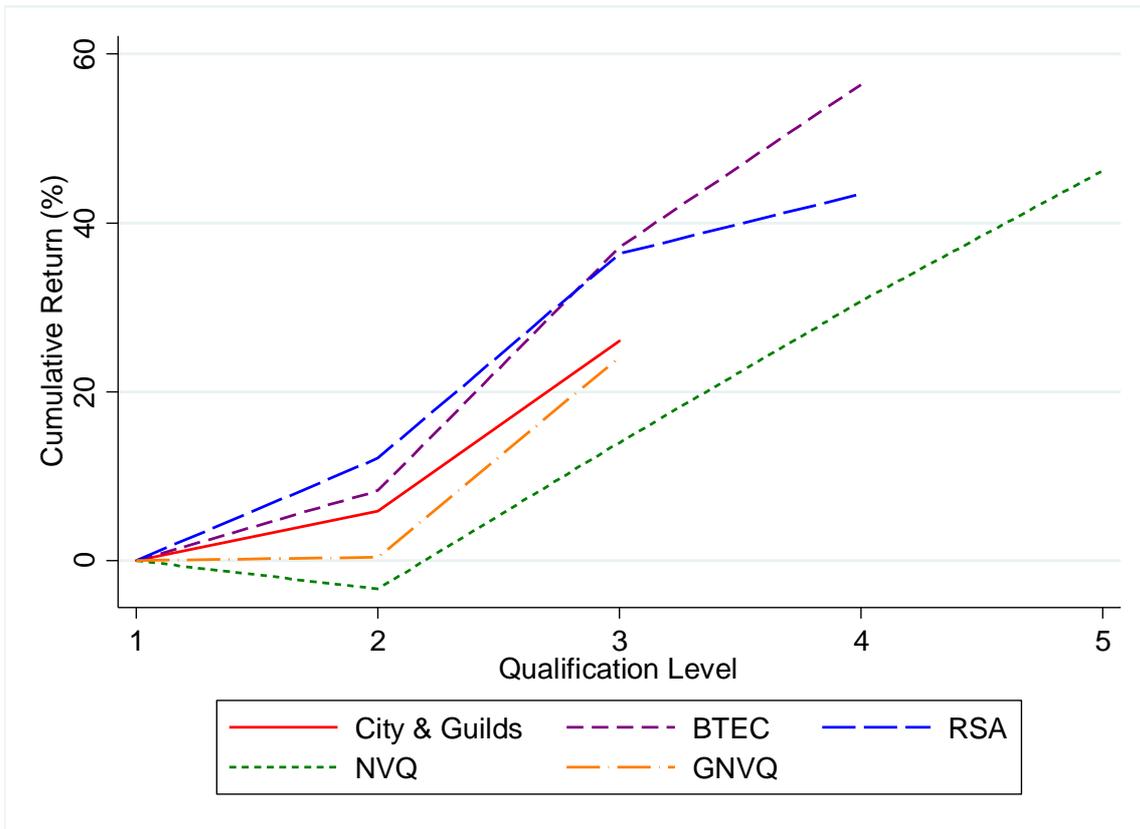


Figure 2: Marginal Returns relative to Vocational Qualifications at Level One (Males)

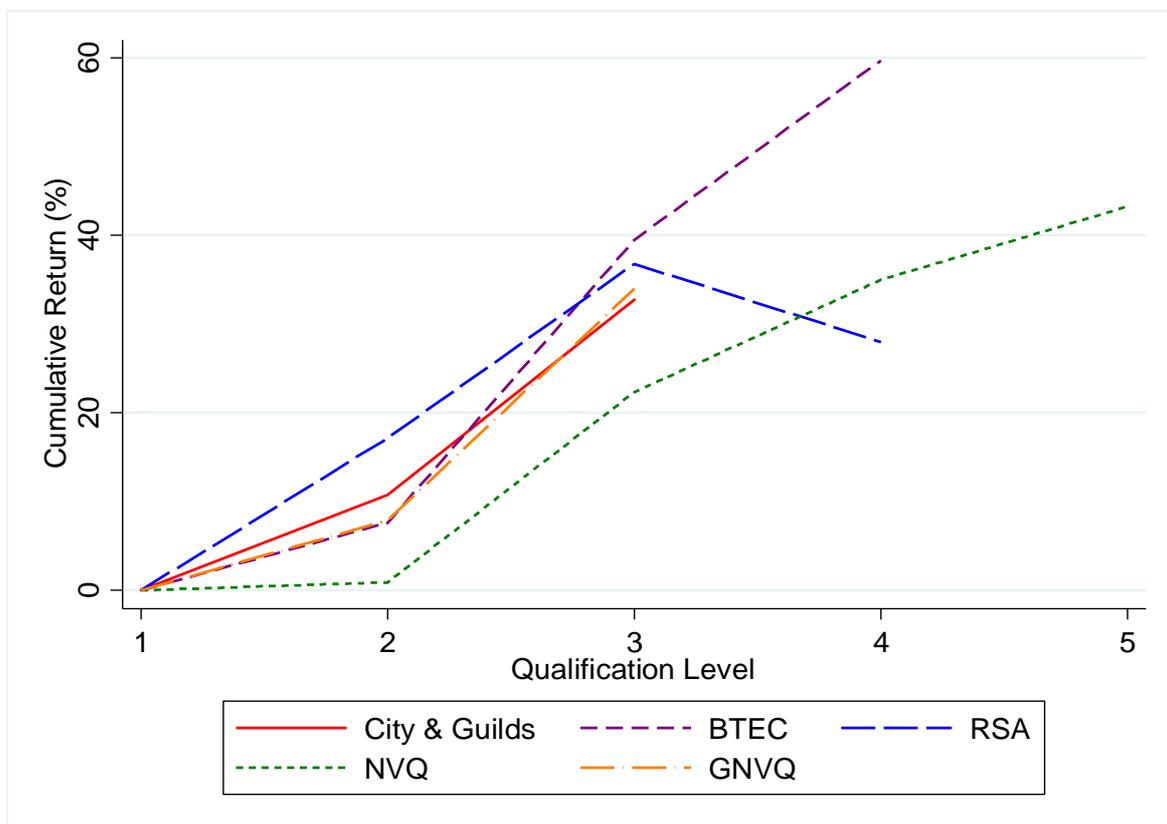


Figure 3: Marginal Returns relative to Vocational Qualifications at Level One (Females)

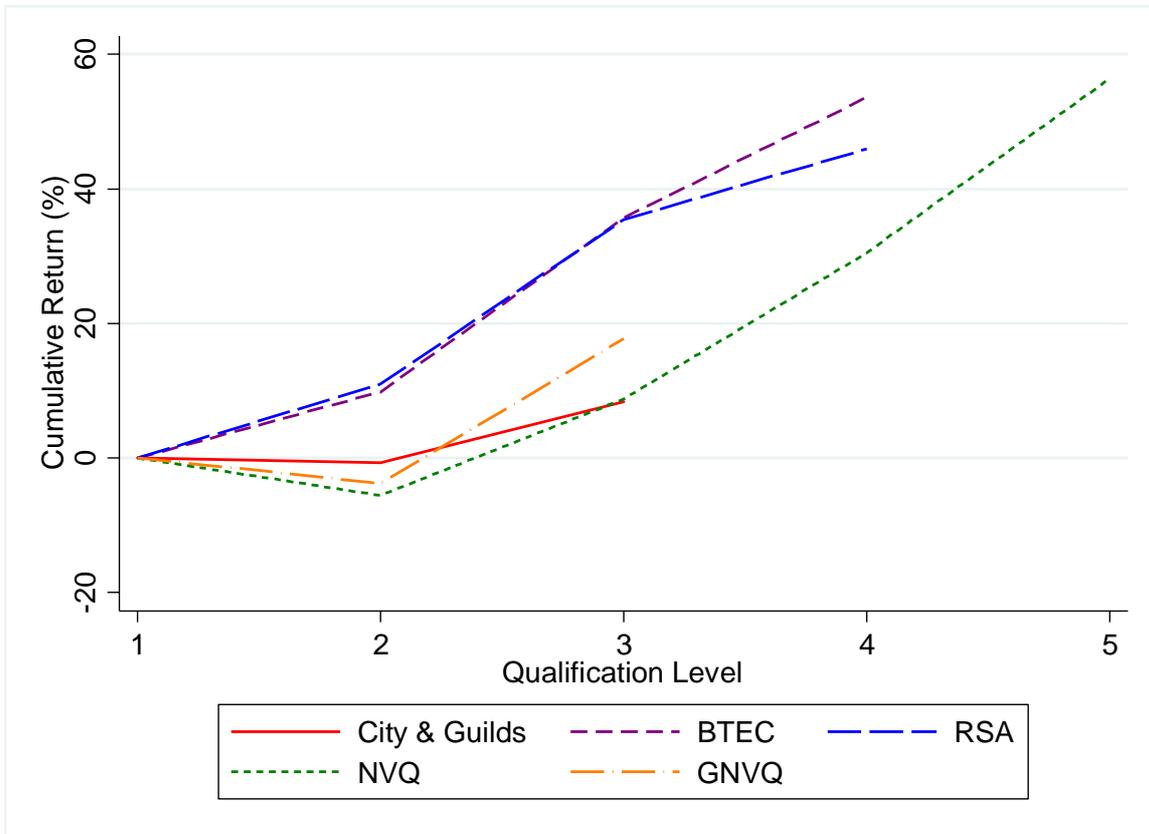
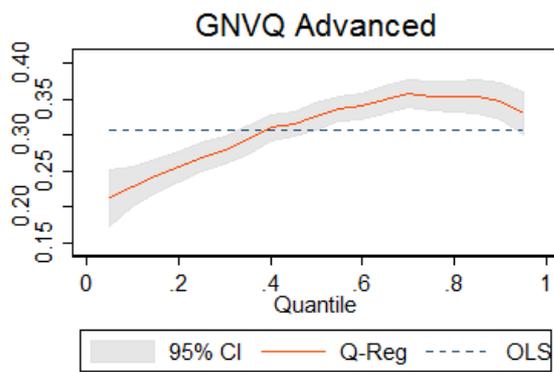
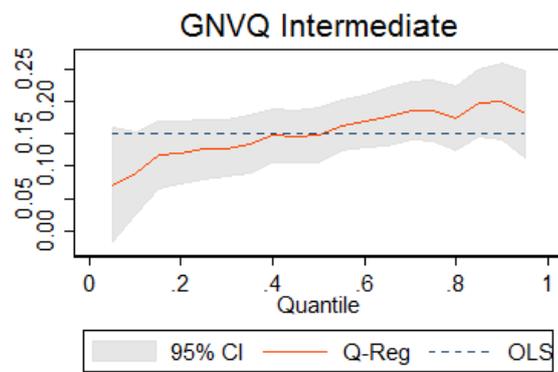
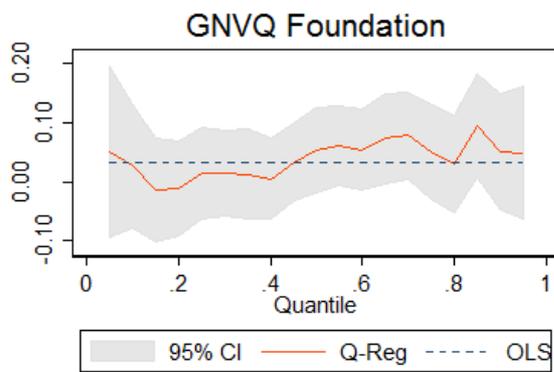
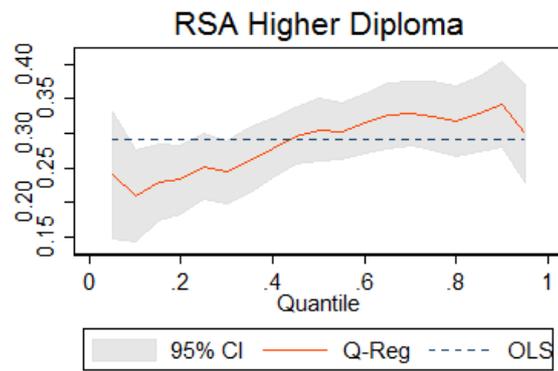
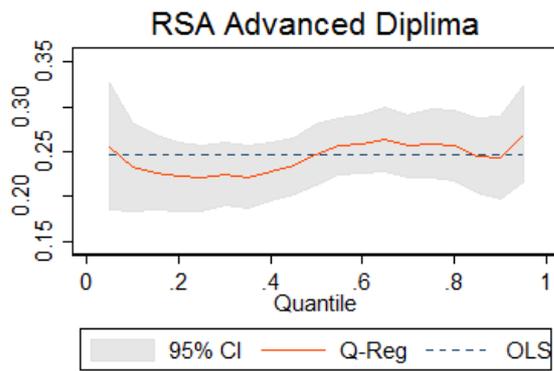
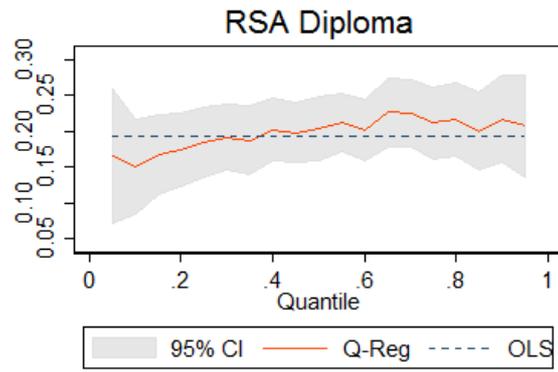
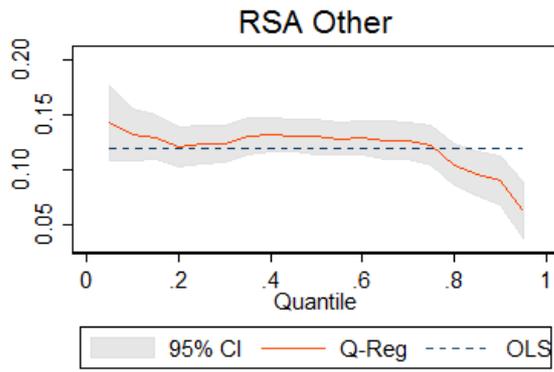


Figure 4: Marginal Returns to Vocational Qualifications by Quantile





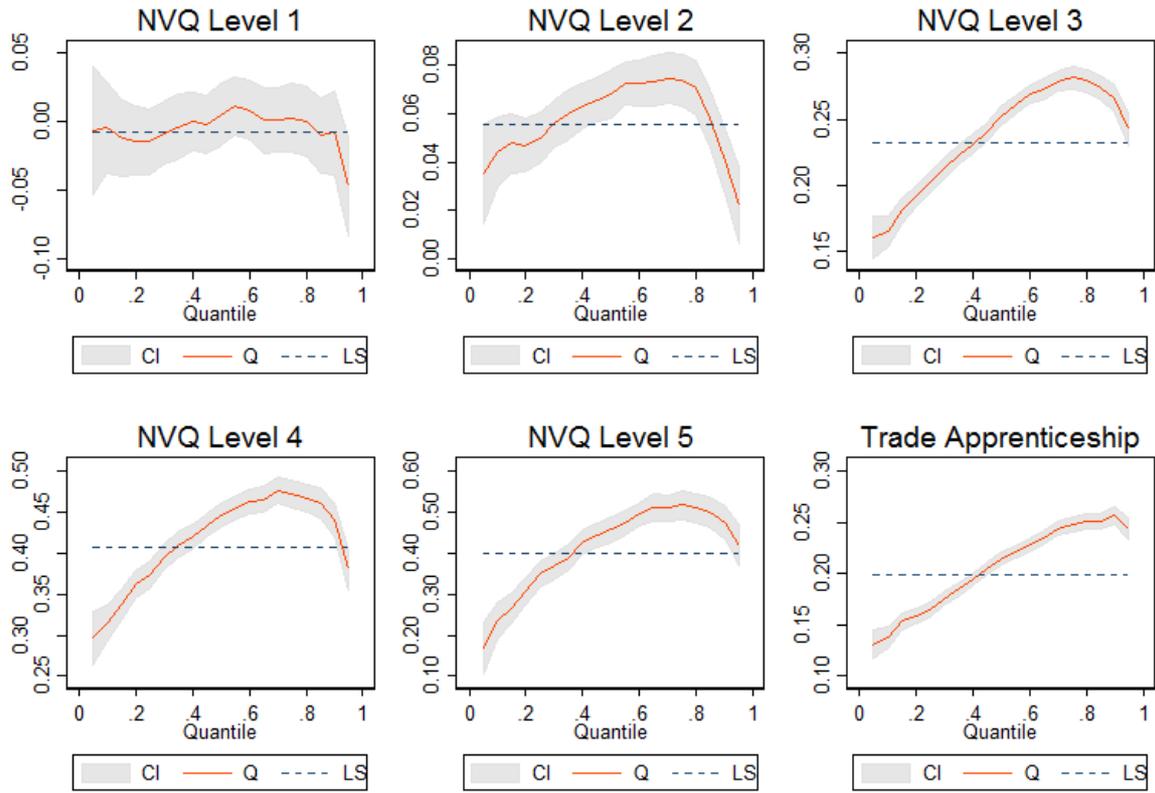
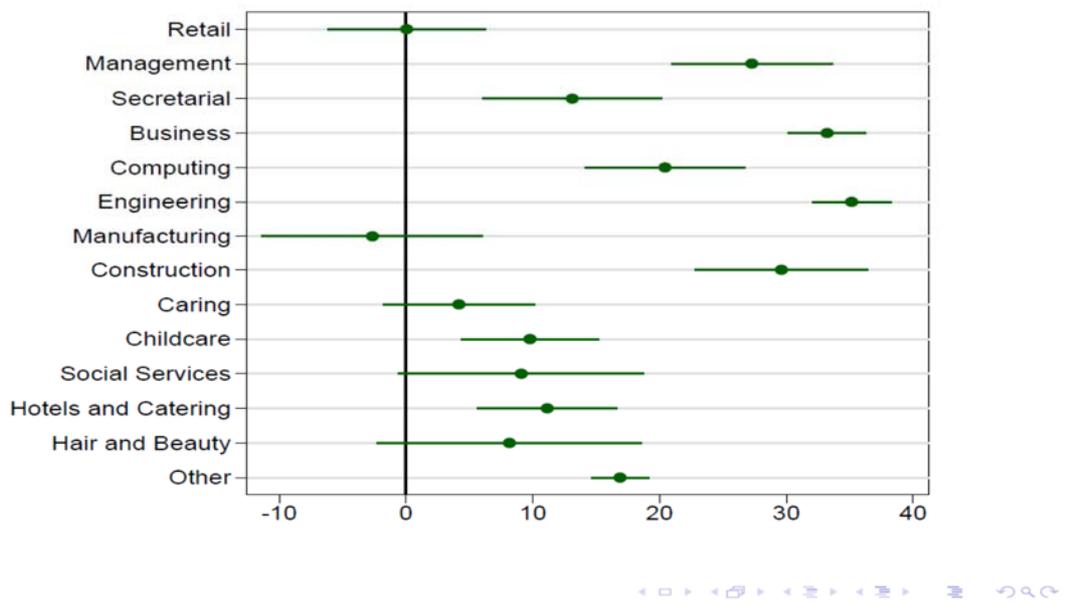
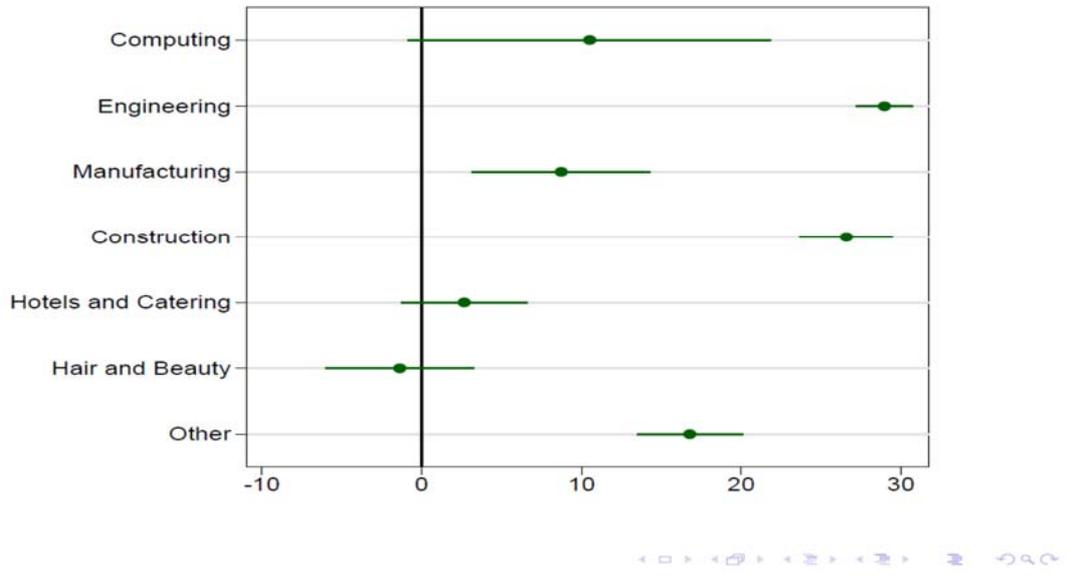


Figure 5: Marginal Returns to Vocational Qualifications by Subject Area

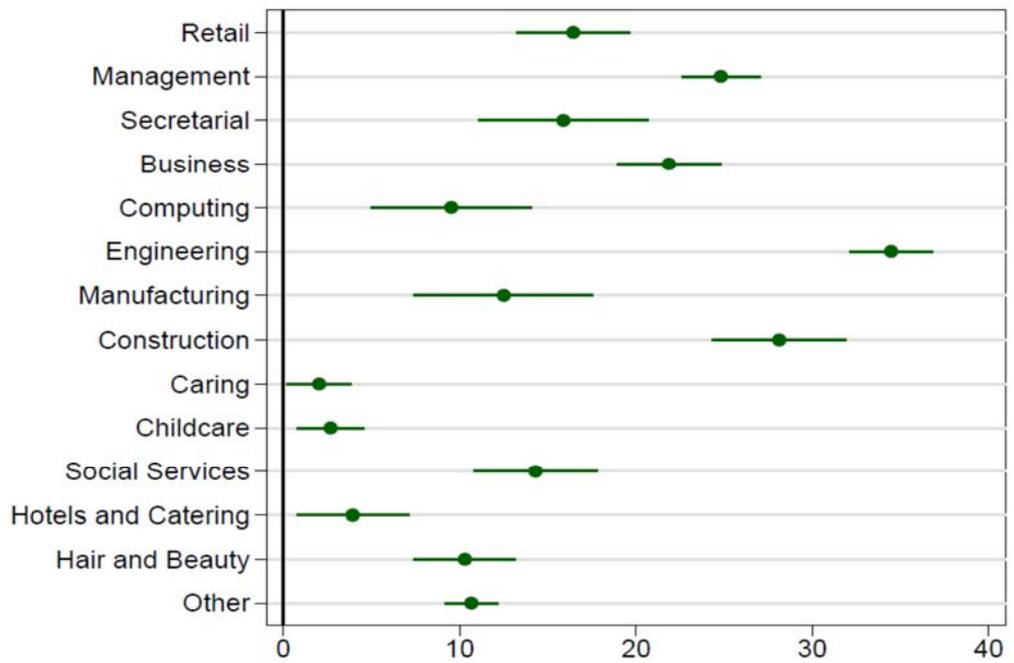
Marginal Subject Returns - Level 3 BTEC



Marginal Subject Returns - Level 3 City & Guilds

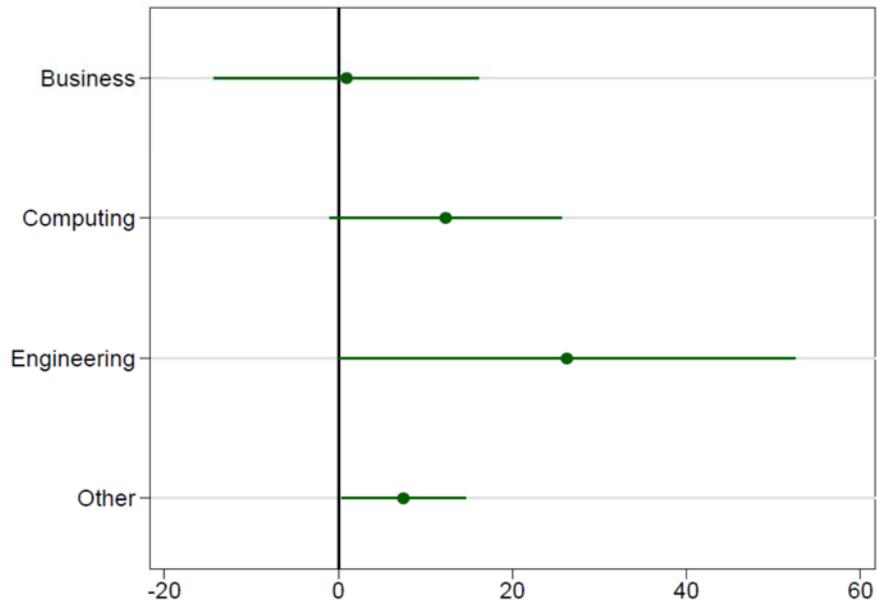


Marginal Subject Returns - Level 3 NVQ



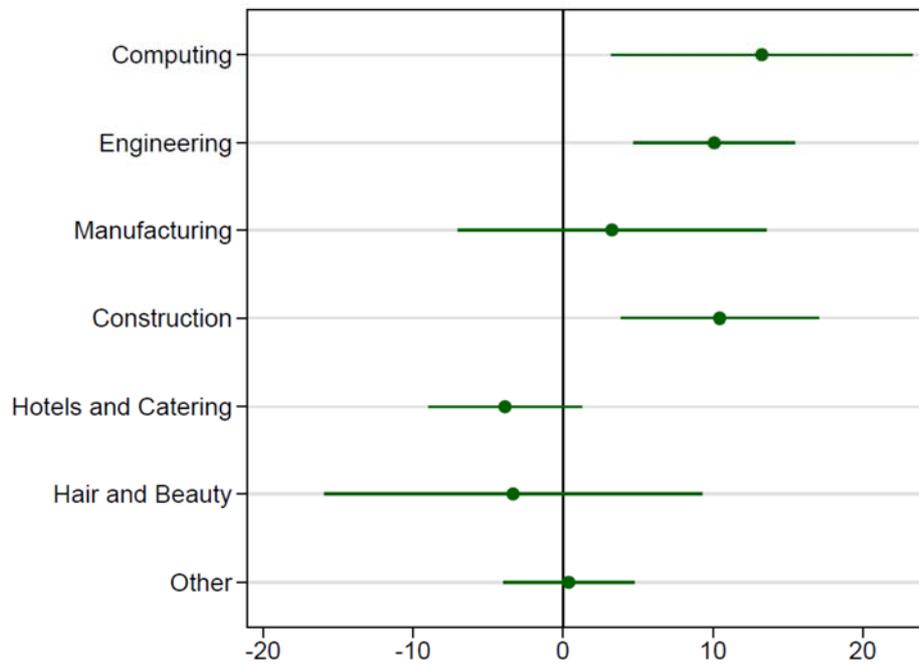
Navigation icons: back, forward, search, etc.

Marginal Subject Returns - Level 2 BTEC



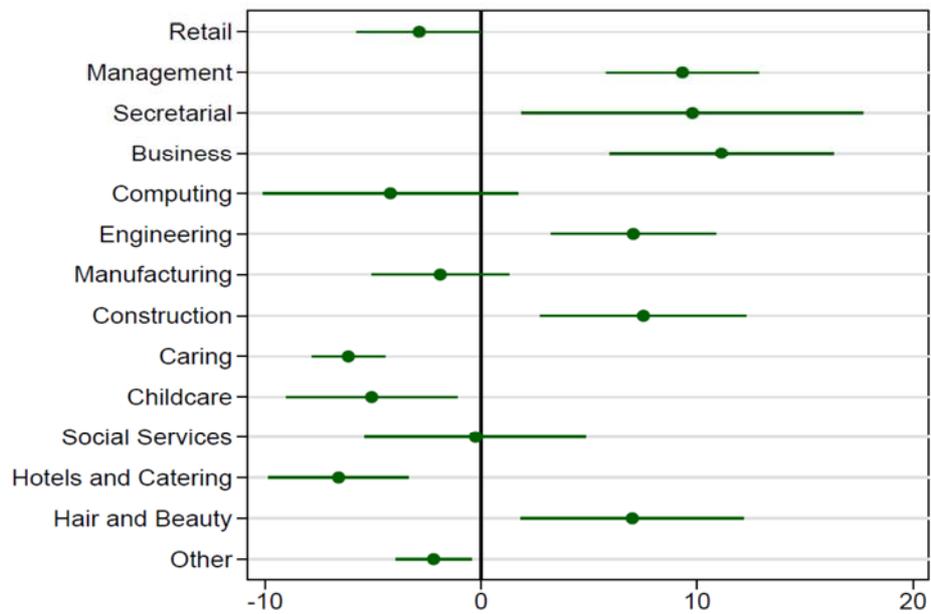
Navigation icons: back, forward, search, etc.

Marginal Subject Returns - Level 2 City & Guilds



Navigation icons: back, forward, search, etc.

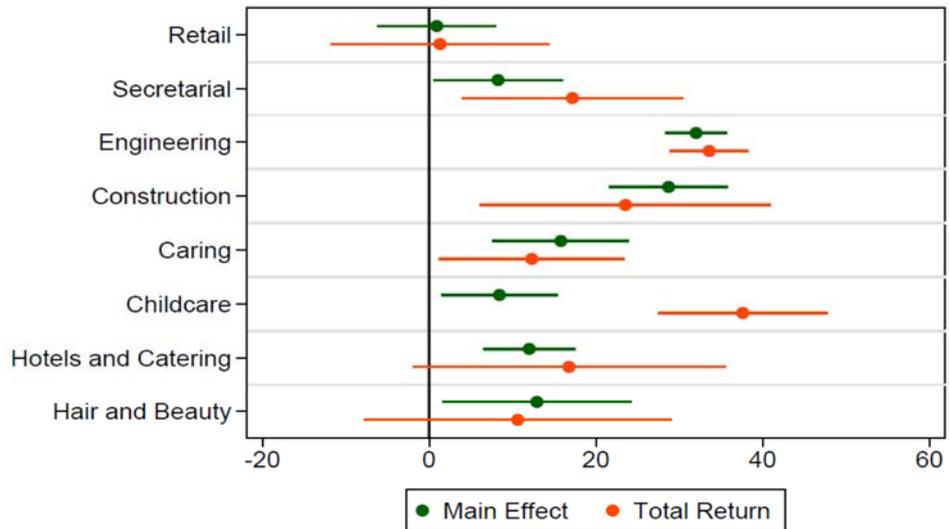
Marginal Subject Returns - Level 2 NVQ



Navigation icons: back, forward, search, etc.

Figure 6: Marginal Returns to Vocational Qualifications by Subject Area, and Occupation

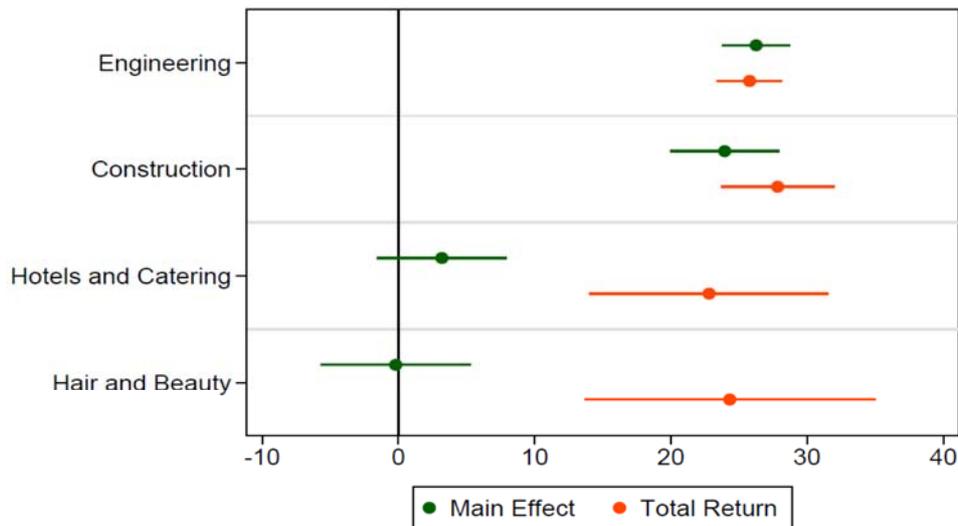
Marginal Subject Returns by Occupational Match - BTEC Level 3



Main Effect: The marginal return which all individuals obtain from a BTEC Level 3 in the respective subject area regardless of occupation.
Total Return: The sum of the main and interaction effects. Total return to a BTEC Level 3 in the subject when "matched" to a relevant occupation



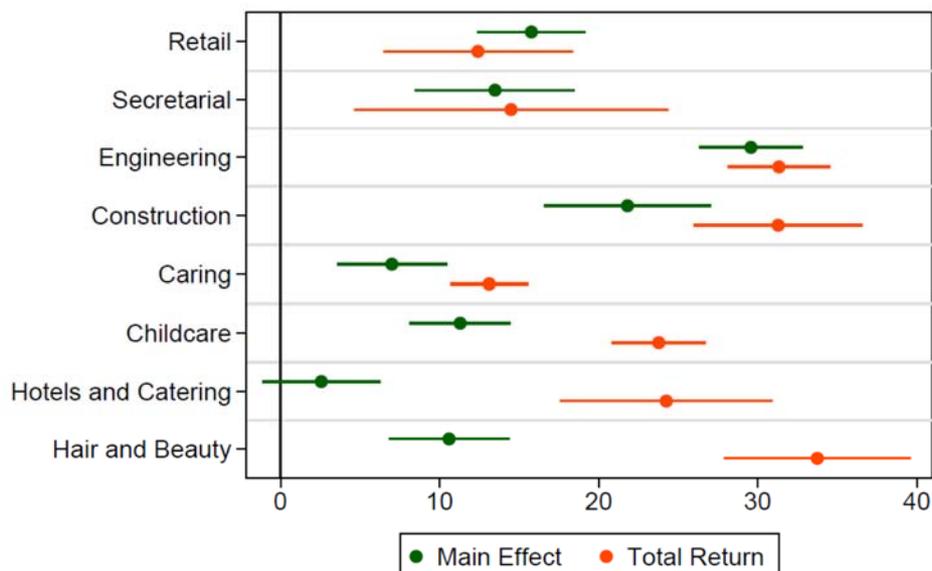
Marginal Subject Returns by Occupational Match - City & Guilds Level 3



Main Effect: The marginal return which all individuals obtain from a City & Guilds Le in the respective subject area regardless of occupation.
 Total Return: The sum of the main and interaction effects. Total return to a City & Guilds Level 3 in the subject when "matched" to a relevant occupation

Navigation icons: back, forward, search, etc.

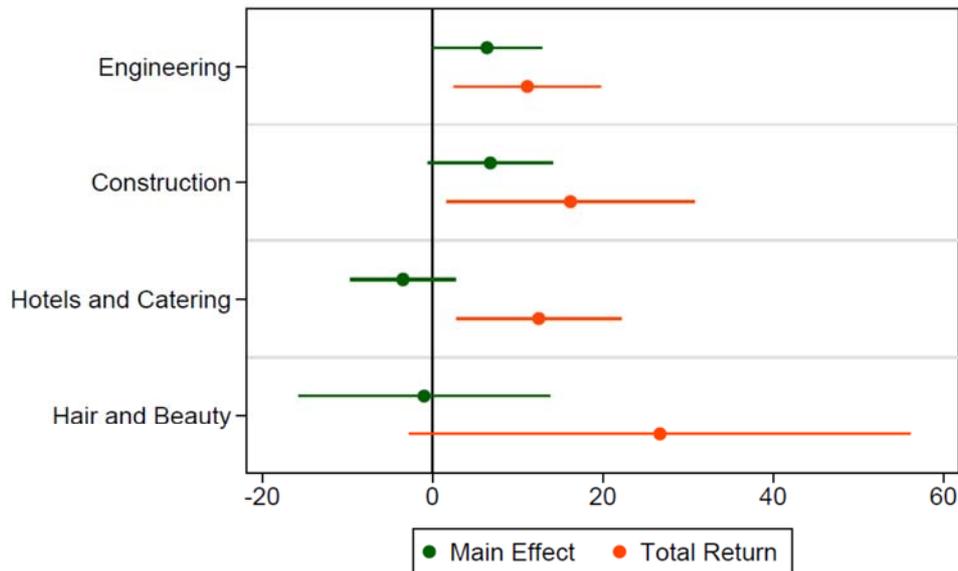
Marginal Subject Returns by Occupational Match - NVQ Level 3



Main Effect: The marginal return which all individuals obtain from an NVQ-3 in the respective subject area regardless of occupation.
 Total Return: The sum of the main and interaction effects. Total return to an NVQ-3 in the subject when "matched" to a relevant occupation

Navigation icons: back, forward, search, etc.

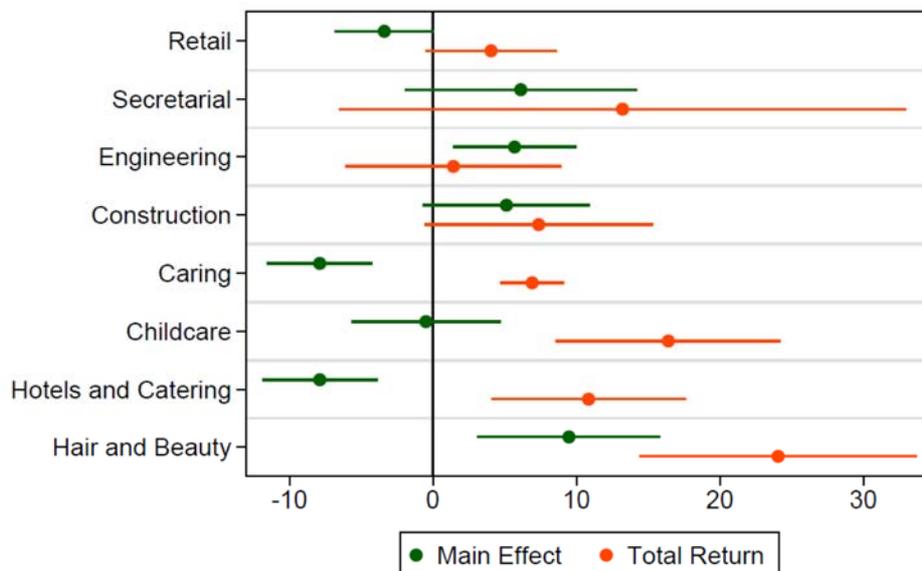
Marginal Subject Returns by Occupational Match - City & Guilds Level 2



Main Effect: The marginal return which all individuals obtain from a City & Guilds Le in the respective subject area regardless of occupation.
 Total Return: The sum of the main and interaction effects. Total return to a City & Guilds Level 2 in the subject when "matched" to a relevant occupation



Marginal Subject Returns by Occupational Match - NVQ Level 2



Main Effect: The marginal return which all individuals obtain from an NVQ-2 in the respective subject area regardless of occupation.
 Total Return: The sum of the main and interaction effects. Total return to an NVQ-2 in the subject when "matched" to a relevant occupation

