The Economic Value of Intermediate Vocational Education and Qualifications

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The Economic Value of Intermediate Vocational Education and Qualifications

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Foreword

Launched on 1st April 2008, the UK Commission for Employment and Skills is a key recommendation in Lord Leitch's 2006 review of skills *Prosperity for All in the Global Economy: World* Class Skills. The UK Commission aims to raise UK prosperity and opportunity by improving employment and skills. Its ambition is to benefit individuals, employers, government and society by providing independent advice to the highest levels of the UK Government and Devolved Administrations on how improved employment and skills systems can help the UK become a world class leader in productivity, in employment and in having a fair and inclusive society.

Research and policy analysis plays a fundamental role in the work of the UK Commission and is central to its advisory function. In fulfilling this role, the Research and Policy Directorate of the UK Commission is charged with delivering a number of the core activities of the UK Commission and has a crucial role to play in:

- Assessing progress towards making the UK a world-class leader in employment and skills by 2020;

- Advising Ministers on the strategies and policies needed to increase employment, skills and productivity;

- Examining how employment and skills services can be improved to increase employment retention and progression, skills and productivities.

- Promoting employer investment in people and the better use of skills.

We will produce research of the highest quality to provide an authoritative evidence base; we will review best practice and offer policy innovations to the system; we will undertake international benchmarking and analysis and we will draw on panels of experts, in the UK and internationally, to inform our analysis.

Sharing the findings of our research and policy analysis and engaging with our audience is very important to the UK Commission. Our Evidence Reports are our chief means of reporting our detailed analytical work. Our other products include Summaries of these reports; Briefing Papers; Thinkpieces, seminars and an annual Research and Policy Convention. All our outputs are accessible in the Research and Policy pages at www.ukces.org.uk

This report has been prepared for the UK Commission and the Department of Business, Innovation and Skills by Dr Steve McIntosh of the University of Sheffield. It makes an important contribution to the UK Commission's work to assess and develop the case for investing in skills by individuals. It examines the economic value to individuals of intermediate vocational qualifications and specifically NVQs at NQF Level 2 and 3.

This report will be followed in the coming months by other reports on major projects in our Business Plan, including a report on the Value of Skills. This will provide wider evidence of the value of skills to; individuals through higher earnings; employers through enhanced firm performance; and Government by greater national economic performance and competitiveness. The wider benefits of skills are also considered.

We hope you find this report useful and informative in building the evidence we need to achieve a more prosperous and inclusive society.

Professor Mike Campbell
Director of Research and Policy Directorate

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Deputy Director and Head of Research

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Executive Summary

1.   Introduction

This report reviews the available evidence on the economic value of intermediate vocational qualifications, looking at the private wage returns (and briefly the improved likelihood of being in employment) associated with such qualifications.

The question that the review would like to answer is: 'what is the economic value of acquiring intermediate vocational qualifications to a particular individual, on average? That is, by how much will his or her wages increase following the acquisition of such a qualification?'

This value could differ, according to whether the new qualification acquired is the individual's new highest qualification and so takes them to a higher level of attainment than they had previously reached, or whether the individual already held qualifications at the same level or even at a higher level than the new qualification acquired. The review will therefore distinguish between such situations. This is particularly important when considering vocational qualifications, since they can often be acquired at a level at or below individuals' existing highest academic qualification.

2.   A Closer Look at What We Want to Measure, and How We Want to Measure It

In order to know how much higher an individual's wages are because they have acquired a qualification, we need an estimate of how much they would earn if they did not hold the qualification. This estimate is derived by considering the wages of a group of individuals without the qualification (the 'control group').

Because individuals with and without the qualification of interest might differ in ways that cannot be controlled for (for example in terms of ability or motivation), it could be differences in such characteristics that are responsible for any difference in wages between the two groups, rather than the fact that one group holds the qualification and the other does not. In this situation, the estimated return would be biased.

With academic qualifications, individuals holding the qualification will be more able and/or motivated on average than those without the qualification, causing estimates of the returns to such qualifications to be biased upwards.

For vocational qualifications, however, particularly intermediate vocational qualifications, it is likely that those who acquire such qualifications will be of lower ability and/or lower motivation on average, so the usual estimates of returns to such qualifications will be biased downwards.

In addition, because vocational qualifications are often acquired after an individual is already in a job, and because the type of jobs where intermediate vocational qualifications are required are often in lower-paying sectors, on average, then the estimated returns to such qualifications will again be biased downwards, since the low wages of holders will be caused by the nature of their job, not the fact that they hold the qualification per se.

The existing literature has frequently found negative estimated returns to intermediate vocational qualifications. Such estimates are evidence of the negative biases discussed in the previous paragraph, since it is unlikely that acquiring a qualification could actually reduce an individual's wages. Certainly if an individual remained in the same job, it is unlikely that their employer would reduce their wage following their acquisition of an intermediate vocational qualification.

In order to reduce such negative bias in the estimated returns to intermediate vocational qualifications, researchers need to create a control group that is more similar to the group of individuals with the qualification, and also doing more similar types of work. Before acquiring an intermediate vocational qualification, individuals would likely have come from a position of being low qualified. A control group comprising individuals with no or only low level qualifications would therefore be more appropriate, providing a more accurate estimate of the wages an individual would have received if they had not acquired the qualification. Also, estimating occupation- or industry specific returns to qualifications will ensure that the control group are doing similar types of jobs to those who acquire the qualification.

3.   Data

Various estimates of returns in the literature are typically derived using data from either the Labour Force Survey, which is a large repeated cross-section data set, or from one of the birth cohort data sets (National Child Development Study or British Cohort Study) which are longitudinal data sets following specific cohorts of individuals (born in 1958 and 1970 respectively) throughout their lives.

4.   Methodology

Most of the estimates of returns in the literature are derived using Ordinary Least Squares regression techniques, which compare the wages of those with and without the qualification of interest, holding constant other observed characteristics included in the regression equation.

If longitudinal data are available, then first-differenced equations can be estimated, examining how the acquisition of a qualification during a particular period in time is related to the *change* in wages over the same period, controlling for any changes in observed characteristics. The advantage of such a methodology is that any unobserved characteristics that remain constant over time will drop out of such a specification (since their change is zero) and so not bias the results.

Regression equations estimating the returns to qualifications can measure qualifications in one of two ways, either as individuals' highest qualification, or including *all* qualifications obtained by an individual. The former method produces 'marginal' estimates of the returns to individuals who have reached the level of the qualification of interest but have gone no higher. The latter method produces estimates of the 'average' returns to individuals, averaged across all individuals who hold the qualification of interest whether as their highest qualification or not. The former method is of more interest to vocational education policy-makers, who are interested in the value of taking individuals to new levels of higher attainment.

5.   Marginal Returns to Intermediate Vocational Qualifications Relative to Specific Qualification Comparator Groups

When individuals acquire an NVQ2 qualification as their new highest qualification, the most recent evidence[1] suggests that they earn around 4% more than individuals with no qualifications. The wage gap is around 2% compared to low qualified individuals (with at best Level 1 academic qualifications and at best Level 2 vocational qualifications other than NVQ2). When disaggregating by gender, these wage differentials are observed for females only.

Other Level 2 vocational qualifications have larger returns when held as highest qualifications, relative to the same specific control groups, for example ranging from

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[1] The numbers quoted in this executive summary are always from the most recent evidence available, which are also often the most positive results. The main report provides more information on the range of results available in the literature.

around 7% for City and Guilds Craft qualifications up to 20% for RSA Level 2, when compared to individuals with no qualifications.

At Level 3, all vocational qualifications receive positive and statistically significant returns when held as highest qualifications relative to specific control groups, ranging from 11% for NVQ3 up to 25% for ONC/OND, with the others in the range of 16-18%, all measured relative to individuals with at best other Level 3 vocational qualifications (other than the one being considered in each case) and at best Level 2 academic qualifications.

The difference in returns across types of vocational qualification is speculated to be caused by differences in the type of training offered, and differences in the unobserved characteristics of the individuals acquiring them.

6. Marginal Returns to Intermediate Vocational Qualifications by Acquisition Route

Some studies estimate the returns to intermediate vocational qualifications separately according to whether they are obtained through employers at work, at a college, or as part of government training.

The available evidence shows that obtaining a vocational qualification through one's employer is the most valuable acquisition route. An individual with an NVQ2 held as a highest qualification and obtained through work earns on average around 10% more than an individual with no or low level qualifications. No other route is associated with positive and statistically significant returns, with the exception of the college route for females only.

7. Marginal Returns to Intermediate Vocational Qualifications by Ability

It is possible to obtain separate estimates of returns to qualifications for low and high ability individuals, using childhood test scores as a measure of ability, or estimating quantile regressions to estimate the returns to qualifications at various points of the wage distribution, rather than only at the mean.

The available evidence is not strong, but suggests that low ability individuals obtain higher returns to intermediate vocational qualifications than those of higher ability.

8. Marginal Returns to Intermediate Vocational Qualifications Relative to Specific Comparison Groups, by Sector and Occupation

Returns to intermediate vocational qualifications estimated relative to specific comparison groups and within particular occupations or industries try to reduce or remove the two sources of bias discussed above (see Section 2), that individuals acquiring such qualifications have lower-valued unobserved characteristics, and are already working in low-paying occupations.

The evidence shows that, compared to individuals with no or only low level qualifications working in the same occupation, individuals acquiring an NVQ2 as their highest qualification earn positive and statistically significant returns in some occupations, namely skilled occupations (8% return), personal services (5%), sales (3%), machine operatives (4%) and elementary occupations (4%). Similarly, certain industries see positive and statistically significant returns to NVQ2 in the same circumstances (held as highest qualification, relative to a specific control group), such as construction (9% return), public administration, education and health (3%) and other services (7%).

Other intermediate vocational qualifications receive large returns when held as highest qualifications relative to no or low-qualified individuals in the same occupation or industry, across a wide range of sectors. The returns are typically larger than those seen for NVQs, though are somewhat erratic and imprecisely measured, due to small cell sizes.

These results serve two purposes. First, they show that returns do vary across sectors, and that intermediate vocational qualifications are more successful in some sectors than in others. Second, comparing the results to those relative to the same control groups, but non-sector specific, averaged across all sectors, the more positive within occupation/industry results show the importance of estimating sector-specific returns, and so controlling for the fact that individuals who acquire intermediate vocational qualifications, particularly NVQ2s, already work in low-paying occupations.

Such estimates therefore come closer than any others available in the literature to answering the specific question posed in the Introduction, concerning the gain in wages to a particular individual from acquiring an intermediate vocational qualification.

9. Returns to Intermediate Vocational Qualifications Obtained as an Adult: Longitudinal Analysis

Longitudinal data have been used to estimate by how much individuals' wages change following the acquisition of an intermediate vocational qualification. Estimating first-

differenced, wage-change equations removes the bias due to a failure to control for unobserved characteristics such as motivation and ability, as long as those characteristics remain constant over time so that their change over time is zero.

The methodology is therefore effectively looking at individuals' wages before and after the acquisition of a qualification, to see whether their wages increase more than the wages of similar individuals. The limitation of such an approach is that if other things are also changing, then the change in wages could be due to these 'other things' rather than the acquisition of the qualification. Furthermore, if such other events are correlated with the qualification acquisition, then the wage change could be wrongly attributed to the qualification variable if the other event is not controlled for. In the present context, an example would be the introduction of the National Minimum Wage in 1999. Given individuals who acquire NVQs are amongst the least well paid in the economy they are more likely to be affected by the new minimum wage, so that those acquiring NVQs see large increases in their wages around this period, but due to the National Minimum Wage, not the NVQ.

The evidence is mixed, with one birth cohort, the BCS showing large wage changes of around 22% for those who acquired an NVQ2 between 1996 and 2004 (age 26 and 34) and 36% for other Level 2 qualifications (academic and vocational combined). However, researchers using the NCDS found no change in wages between 1991 and 2000 (age 33 and 42) for individuals who acquired intermediate vocational qualifications between these ages.

More longitudinal evidence is undoubtedly needed in the literature estimating returns to qualifications, because it is closer to what we want to measure, namely the change in particular individuals' wages following the acquisition of qualifications. More frequent observations on individuals, so that less time elapses before wages are re-measured, would help limit the possibility of other things changing to also affect wages.

10.   Apprenticeships

Apprenticeships have been shown in the literature to be an effective means of supplying vocational education, with positive and statistically significant returns observed.

Traditionally such good returns have been observed for males only, but more recent evidence, looking at apprenticeships completed since their reintroduction in the form of Modern Apprenticeships, has found evidence of positive and statistically significant returns for females as well, at Level 3.

Relative to a comparison group with Level 2 qualifications (either academic or vocational), those who complete a Level 3 apprenticeship earn a wage premium of 22% for males and 14% for females. Relative to a comparison group with Level 1 or Level 2 qualifications, those who complete a Level 2 apprenticeship earn a wage premium of 20% for males and 4% (statistically insignificant) for females.

Cost benefit analysis taking into account the costs to government, employers and individuals of providing or undertaking an apprenticeship show apprenticeships are a more cost-effective means of providing vocational learning than other intermediate vocational qualifications. Note however that this is comparing apprenticeships to other intermediate vocational qualifications averaged across all delivery routes. The difference might be less clear cut if apprenticeships were to be compared to other intermediate vocational qualifications provided through the employer route only, which have a higher return as noted above.

11. Marginal Returns to Intermediate Vocational Qualifications, Full Sample Results

When a full sample is used, i.e. the sample is not restricted to specific control groups, then individuals with high level academic qualifications could be in the control group with no vocational qualifications.

When the sample is not restricted at all, then the estimated return to holding an NVQ2 or City and Guilds Craft qualification as a highest qualification becomes negative.

BTEC and RSA Level 2 qualifications held as highest qualifications still attract positive and statistically significant returns (of 5% and 4% respectively) when using a full sample control group.

At Level 3, all vocational qualifications attract positive and statistically significant returns in this specification, ranging from 16% for ONC/OND to 6% for NVQ3.

12. Marginal Returns to Intermediate Vocational Qualifications by Age of Acquisition

A potentially useful question in the Labour Force Survey asking when individuals obtained their highest qualification could be used to provide further information as to who receives the most economic value from intermediate vocational qualifications.

The evidence shows very large positive returns to all intermediate vocational qualifications for the under 25s, which are larger than for the over 25s, with the difference between age groups particularly pronounced for NVQs.

There is a problem with such evidence, however, in that separate academic and vocational highest qualifications cannot be identified, so that the estimated return to any highest vocational qualification will include the returns to all qualifications, including academic qualifications, held up to that level. This could explain the high estimated returns being observed.

13. Average Returns to Intermediate Vocational Qualifications

Apart from the longitudinal, first-difference results, all of the evidence discussed above has been in terms of the returns to qualifications when held as highest qualification. However, particularly with intermediate vocational qualifications, they can often be obtained at a level equal to or even below individuals' existing qualifications. We would like to know the economic value of obtaining qualifications in such circumstances, but no estimates exist, due to the lack of appropriate data.

What is observed is the average return to qualifications across all individuals who hold them, whether as a highest qualification or not. Given that we would expect the return to be lower when an individual has already attained at that level, such average returns should be smaller than the returns to qualifications when obtained as highest qualifications. This is exactly what we observe.

The estimates show that, on average, individuals who have obtained an NVQ2 or a City and Guilds Craft qualification earn less than individuals who have not. Even when the comparison group is restricted to individuals with at best Level 1 academic qualifications or at best Level 2 vocational qualifications, the NVQ2 returns remain negative and the City and Guilds Craft returns become positive but are tiny. Of the Level 2 vocational qualifications, only BTEC earns a positive and statistically significant return (4%) when using the full sample control group, with BTEC (8%) and RSA (12%) obtaining the positive and statistically significant results when the control group is restricted to low qualified individuals.

At Level 3, all vocational qualifications receive positive and statistically significant returns, with the exception of NVQ3 when the full sample control group is used.

Further work is needed to identify the specific return to obtaining a qualification when other qualifications at an equal or higher level are already held, rather than the returns

averaged across all individuals whether they are holding the qualification as highest qualification or not, as presented here.

14.   Returns to Intermediate Level Academic Qualifications

By way of comparison to the vocational results, returns to intermediate academic qualifications have also been estimated.

Such returns are higher than those obtained for intermediate vocational qualifications. For example, the marginal returns to holding a qualification as a highest qualification are 44% for 2 or more A Levels, 32% to 5 or more O Levels and 25% to 5 or more GCSEs.

When comparing such returns to those obtained for intermediate vocational qualifications, it must be remembered that the likely ability bias is positive for academic qualifications and negative for vocational qualifications. In addition, academic qualifications typically take longer to acquire, which would narrow the gap in rates of return per unit of time invested in the two types of qualification.

15.   Employment Effects of Intermediate Vocational Qualifications

There is evidence of a positive association between holding vocational qualifications and being in employment, though the direction of causality is not clear (i.e. which came first). The association is stronger when the inactive are included in the estimating sample, but weaker when only those in, or actively seeking, work are considered.

For example, when the comparison is between being employed or unemployed, intermediate vocational qualifications at Level 3 are associated with a 1-2 percentage point higher probability of being employed, when held as highest qualifications, relative to a full sample comparison group. There is no significant effect for Level 2 vocational qualifications in this case though. When the comparison is between being employed on the one hand and being unemployed or inactive on the other, intermediate vocational qualifications held as highest qualifications are associated with a 12-17 percentage point higher probability of being employed for Level 3 qualifications, and a 9-14 percentage point higher probability of being employed for Level 2 qualifications, all compared to a full-sample control group.

Part A: The Methodology of Estimating Returns to Qualifications

1. Introduction

This report reviews the recent evidence on the returns to qualifications. The evidence to be reviewed will be for Britain[2], unless otherwise stated. One paper in particular that is reviewed in detail below is for England only (Jenkins *et al.*, 2007). The aim of this exercise is to provide updated information to policy-makers and individuals, who have to make decisions about whether to invest in education. The particular question that the report would like to answer is: 'what is the value of undertaking training and attaining an intermediate vocational qualification?' As will be seen, obtaining an answer to this question is much less straightforward than might be expected.

Before attempting to answer the question, some boundaries will be set. First, the value of qualification attainment to be measured will only be economic value, and specifically labour market value. Thus consumption benefits of education ('learning for learning's sake'), or non-economic effects of education (such as better health, lower crime etc) will not be considered here[3]. Second, the private return, rather than the public return, will be considered. This will be measured by the higher wages earned by individuals with higher qualifications, as well as any higher rates of employment enabling them to earn these wages. These are private benefits to the individuals with the qualifications. If wages are a perfect measure of an individual's productivity, as predicted by the theory of competitive labour markets, then higher wages will also be a measure of the value of the higher marginal product produced by more educated workers, though even this will not be the full economic benefit of the qualification to society, to the extent that externalities exist, and the educated workers also raise the productivity of others, such as work colleagues[4]. In addition, the assumption of perfectly competitive labour markets is probably unrealistic in most circumstances.

A further consideration to be made is the age of the acquisition of qualifications. Much is known about the benefits of initial full-time education, both from the point of view of

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[2] The papers that use British data tend to group similar qualifications from different parts of Britain together, for example grouping SCOTVEC with BTEC qualifications, or Scottish Highers with A levels. Throughout this report, the English and Welsh qualification name is used to identify the category. Therefore the qualifications reviewed in this report would be more accurately described as, for example, 'BTEC or equivalent', and should always be interpreted as such, unless otherwise stated.

[3] For a review of evidence, and methods of investigation, on the wider benefits of learning, see Schuller *et al.* (2001).

[4] Of course, if such externalities exist, then the labour market is already not perfectly competitive.

individuals and society. Initial education is seen as a key source of economic growth, supplying the skills that are needed in the economy. However, if qualification attainment, and more particularly skill acquisition, of the country's workforce are to be increased, then it would take many more years to achieve any target if only new entrants to the labour market are considered, the stock of existing workers being many times greater than the flow of new entrants. Raising the skill levels of current adult workers should therefore also be a priority. Analysis of the returns to qualifications gained as adults will provide an indicator of the value that the labour market puts on those qualifications. Variation in returns across qualifications would then show policy-makers which training and qualifications, for which types of people, and through which delivery routes, resources should be targeted towards.

There are many reasons why adults decide to learn and acquire new qualifications. They could be trying to increase their skill base, looking to acquire new skills (though not necessarily higher level skills than their existing skills) to make a career change, or simply wishing to study something due to an interest in the subject, unrelated to their career. The labour market return that we would expect to observe could be very different according to the motivation for the learning. In particular, learning for private pleasure would be very unlikely to have any impact on an individual's labour market outcomes. None of the data sets to be considered in this review have information on motivation to learn for past qualifications. However, the review will be concerned throughout with the labour market impact of formal qualification acquisition, with a particular focus on intermediate level vocational qualifications. As their name suggests, these are vocationally-related qualifications, providing learning and skills to be used in specific occupational settings, or sometimes more general but still work-related skills. It is unlikely that many such qualifications are obtained for private interest reasons. It is much more likely that learning for the pleasure of it takes place on uncertified courses, or courses that do not lead to the qualifications considered here[5].

Despite ruling out general interest learning for consideration here, this still leaves the two other reasons for adult vocational qualification acquisition mentioned above. The crucial question that we want to answer is 'what is the economic value of such acquisition – i.e. to what extent do the skills learnt through training, and verified by the qualification, increase the individuals' ability to do their jobs, hence their value to their employers, and hence their wages and employability?' If it was possible to do so, this question could be answered by comparing the wage that the individuals earn after acquiring the qualification

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[5] This is not to say that vocational qualifications are *never* acquired for non-work reasons. For example, individuals might acquire building, design or car mechanic qualifications, for use purely in the home. We are therefore saying that such personal acquisition will be a minority of all vocational qualification acquisition.

to the wage that they would receive *all else equal* (i.e. in the same job, at the same point in time, with all other personal characteristics also unchanged) without the qualification. Of course, this is impossible, as we cannot observe the same individual in two situations (with and without the qualification) at the same point in time. This report will therefore look at the many estimates of returns to qualifications that have been produced in the literature, and discuss how close they come to this theoretical ideal, and so how accurately they answer the above question.

It was mentioned above that individuals can acquire a qualification as their new highest qualification, or instead at a level that is the same or even below the level of their current highest qualification. With academic qualifications, the former is by far the most likely. Academic qualifications, up to tertiary level at least, provide general knowledge and training that builds up one level at a time. It would be a relatively rare occurrence for an individual with A levels to go back to study for a GCSE. The focus of this review, however, is on vocational qualifications, and in this case it will be far more common for an individual to acquire a qualification that is at or below their current highest qualification level. In the vast majority of cases, vocational qualifications provide occupation-specific skills, on top of the general skills that an individual might have acquired through academic qualifications. It is therefore perfectly possible that an individual might have good GCSEs or A levels, begin a job that requires vocational qualifications, and acquire a vocational qualification at Level 2. If such a qualification was required for their job, then we would expect such individuals to be of increased value to their employer, and so receive an increase in their wages, even though they have not increased their level of attainment. The challenge for research in such circumstances would be to identify the 'pure' return to that qualification, that is to separate the return due to that qualification in particular from the return to the other qualifications held.

In principle, differentiating between the return to qualifications when acquired as a new highest qualification, and when acquired at the same or lower level of attainment than existing qualifications can be of use here. The former, by definition, will be unaffected by other qualifications held at the same or higher level. Such estimates of returns would therefore be more likely to indicate the value of the qualification in its own right. There is a second advantage of separately identifying the return to a qualification when it is held as a highest qualification. A qualification held as an individual's new highest qualification will, by definition, raise their level of attainment. Education policy-makers have in general argued that scarce public funding should be prioritised toward those who have not yet achieved a Level 2 or Level 3 qualification, and since 2002 the government has had a commitment to raise the skills of the workforce, with particular attention on raising the proportion of the workforce who are qualified to Level 2 or higher (though of course

qualification attainment that is not at a new highest level also remains of policy interest). Therefore the returns to those who gain a first qualification at the next highest level and particularly those who move up to Level 2, is central to policy interest. The value of the higher attainment is the crucial information that policy-makers require, so they know where to target resources. This review will therefore separately identify returns to qualifications held as highest qualification and give emphasis to such returns. This is not to say that the value of a qualification acquired at a level previously reached or already exceeded is irrelevant, since this may be a common situation for vocational qualifications, for the reason discussed above. This review will therefore also discuss whether evidence exists to provide an estimate of the returns to such qualification acquisition.

At the start of this introduction, the question that the review intended to answer was stated as: 'what is the value of undertaking training and attaining a qualification?' Following the discussion in this introduction, we can now amend this question to provide a tighter focus for the review. The main question to be answered is: 'what is the 'pure' labour market economic value to individuals of acquiring intermediate vocational qualifications in their own right, as an adult?' This report discusses recent literature that has estimated returns to qualifications, and considers how close they come to answering the question[6]. A range of different estimates will be considered, most importantly across different qualifications and whether they are acquired as a new highest qualification or not, but also considering variation by gender, mode of delivery, ability of the individuals, occupation and sector. Attention will be on intermediate vocational qualifications, at Levels 2 and 3 throughout. While both low level (Level 1) and tertiary level qualifications are of course of interest, the issues and individuals involved are of a very different nature and so are deserving of a review in their own right, rather than clouding the issues to be reviewed here with respect to intermediate qualifications. Along the way, these returns will be compared to other returns where possible, for example the returns to academic qualifications.

The structure of the report is as follows. The remaining chapters in Part A of the report consider in more detail the theoretical considerations of how best to estimate the returns to intermediate vocational qualifications, to answer the particular question posed above, and then describe the data and econometric methods that have actually been used in the literature. Part B of the report contains the key results in the literature that come closest to answering the question posed above, through the consideration of returns to intermediate vocational qualifications relative to particular control groups and in particular

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[6] If they do not answer this particular question, then that is of course no criticism of the original studies, which may well not have been attempting to answer such a question. Furthermore, as will be discussed in this review, it may not even be possible to precisely answer the question with the current data available in the UK.

situations. The final part of the report, Part C, then presents a wider range of estimated returns from the literature, that in general do not answer the particular question as well as those in Part B do. It was important to still include these results in the report, however, in order to provide a context for the results presented in Part B, and also to present a thorough review of available evidence. In this sense, the report moves from the specific to the general in terms of the estimated returns, since it was felt that the returns discussed in Part B should be given priority.

2. A Closer Look at What We Want to Measure, and How We Want to Measure It

The above Introduction to this review has set out the policy question that we want to answer, namely what is the economic value of intermediate vocational qualifications, or in other words, by how much is an individual's wages and employability increased after acquiring an intermediate vocational qualification, which will indirectly measure by how much their productivity has been increased. The aim of this section is to discuss in more detail how we might in theory try to answer this question, before turning to the available evidence that has been produced.

As mentioned in the Introduction, in theory what we want to measure is the difference between an individual's wages with the qualification, and his/her wages without the qualification, but everything else (moment in time, job, personal characteristics) being the same. Of course, this cannot be done because we cannot observe the same individual in two situations (with and without the qualification) at the same point in time. Therefore we have to compare the wages of individuals with the qualification of interest to the wages of individuals without that qualification to provide an *estimate* of the wage gain attached to acquiring the qualification[7]. Because the individuals without the qualification may differ in a variety of ways from the individuals with the qualification, such estimates are likely to be subject to a number of biases, as discussed below.

2.1 Upward Bias in the Estimates of the Returns to Qualifications

The academic literature on the returns to education has traditionally been concerned with an upward bias on the estimates of returns to education or qualifications.[8] The cause of such a bias is the fact that individuals do not acquire qualifications by random, but have chosen and/or been selected to study for those qualifications. If the selection criteria also

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[7] Chapter 4 below discusses the actual econometric methodology used to produce such estimates. In this section we are concerned with the general principles involved.
[8] For a full review of the arguments and methods used to correct such biases see Card (1999).

affect wages, then differences in wage for those with the qualification may be due to having the selection criteria, rather than the qualification itself. Such an argument is usually framed in terms of ability (and the resulting bias is often termed 'ability bias'). The more able are more likely to acquire qualifications, and are also more likely to earn more irrespective of the qualifications they hold. In this case, we would not know how much of the higher wages received by well-qualified individuals is due to the skills they have learned in acquiring those qualifications, and how much is due to the fact that they were more able and so would have earned more in the first place. Similar arguments leading to a positive bias can be made in terms of family background, or characteristics such as motivation.

When such arguments are made, it is fair to say that it is usually general/academic qualifications that the commentator has in mind. Ability is likely to be particularly correlated (positively) with academic qualifications, since young people are typically encouraged or pushed through the education system as far as their ability will take them. We would therefore expect to see high returns to academic qualifications such as GCSEs, A levels and degrees, to the extent that they are certifying the abilities that people are born with.

There are also other, related, circumstances under which the estimated returns to qualifications could be biased upwards. The estimated returns to qualifications may in some cases conflate the skills acquired with employers' recruitment practices. For example, employers may take the acquisition of a qualification as a signal that the holder will have desirable, unobserved, characteristics as a worker (ability, motivation, work ethic etc), and so pay them accordingly, even if those characteristics are not present in the individual. This is again more likely to be the case with general, academic qualifications, since they are widely understood, and studied for by most people, so that successful acquisition will be more likely to be taken as a signal of desirable characteristics, rather than say a signal of qualification availability.

Similarly, qualification acquisition and training could be linked to other changes that themselves increase wages, for example, an individual being promoted, and then placed on a suitable training course required for their new position. In such a situation, the higher wages would be a function of both the new skills acquired in the training, and the wage levels commensurate with the individual's new position in the work hierarchy.

Finally, in circumstances where we only observe an individual's highest qualification, the estimated return to that qualification will not only represent the wage gain due to the skills

obtained when that highest qualification was acquired, but also the wage gain due to all the other qualifications acquired below that highest level.

Summary

Unobserved characteristics of individuals that are correlated with the receipt of qualifications and that also influence wage, will bias the estimated returns to qualifications. If individuals who acquire qualifications are more able than individuals who do not, then the estimated returns to those qualifications will be biased upwards, since the qualification variable also picks up the effect of the unobserved ability on wages. Such arguments are usually made about the estimated returns to academic qualifications, since the education system pushes individuals to achieve the highest academic qualification that their ability will allow. The estimated returns to academic qualifications are therefore likely to be biased upwards.

2.2   Downward Bias in the Estimates of the Returns to Qualifications

It was argued in the previous sub-section that if individuals who already have wage-enhancing characteristics are also more likely to acquire qualifications, then the estimated returns to those qualifications will be biased upwards. However, this argument works both ways, and if some qualifications are more likely to be acquired by individuals with characteristics that would otherwise reduce their wages, then the estimated returns to such qualifications will be biased downwards. Thus, if a qualification is typically acquired by a group of individuals of, on average, lower ability, then the wages of that group are likely to be lower than another group of individuals without the qualification. This negative wage difference will be due to the differences in the starting ability of the two groups, however, not due to the acquisition of the qualification itself. In this case, the control group without the qualification do not provide a good estimate of the counterfactual, that is the wages that first group *would have received* if they had not acquired the qualification.

Such arguments may be particularly relevant to intermediate vocational qualifications. As argued above, young people are encouraged and pushed to go as far as their ability will take them through the general stream of academic qualifications. The more able are therefore more likely to reach Level 2, 3 or even higher via academic qualifications, and so are less likely to acquire vocational qualifications at Levels 2 or 3. People who do acquire such qualifications are therefore more likely to be selected from the group with lower than average ability, thus biasing downwards any estimated returns to such qualifications when evaluated against individuals without such qualifications.

Similarly, it might not be characteristics of the individuals causing the negative bias in the estimated returns, but the characteristics of the job that they do. For example, if an individual has chosen to work in a typically low-paid occupation, and a qualification is required or expected to continue working or to progress in that occupation, then the individuals with such a qualification will typically earn less than individuals without it, but due to the nature of their chosen occupation, rather than due to the acquisition of the qualification itself. Again, the control group do not provide a good estimate of the wages that the acquirers would have received without the qualification, since the former will mostly be outside the low-paying occupation in which the latter have chosen to work, and would continue to work even without the qualification. This negative bias is again more likely to be observed when estimating the returns to intermediate vocational qualifications, since they are much more likely to be the required qualifications in low-paying occupations than general academic qualifications.

Finally, estimated returns may be biased downwards when particular qualifications are confounded with other factors that negatively affect labour market outcomes. For example, any qualifications that are acquired as part of government training for the long-term unemployed may be tainted in employers' eyes, who may consider candidates with such qualifications as historically lacking employability skills, so that their labour market options are reduced. Once again, it is more likely to be intermediate vocational qualifications that are associated with government training schemes.

Summary

In contrast to the previous section, if certain qualifications are more likely to be acquired by individuals with *lower* ability, then the estimated returns to those qualifications will be biased *downwards*. This is likely to be the case for intermediate vocational qualifications. Higher ability individuals tend to pursue academic qualifications as far as their ability takes them, so many have no need for intermediate vocational qualifications.

Other potential causes of negative bias on the estimated returns to intermediate vocational qualifications include the idea that they may be taken by individuals already working in lower-paying occupations, whose wages are therefore lower on average compared to individuals without such qualifications working in higher-paying occupations, but because of the occupation not the qualification. Similarly, if the acquisition of intermediate vocational qualifications is associated with other factors that tend to reduce wages, for example involvement in government training, then the estimated returns to intermediate vocational qualifications would again be biased downwards.

2.3 Estimated Negative Returns to Qualifications

Estimated returns to intermediate vocational qualifications, when derived in a standard setting comparing the wages of holders to the wages of non-holders, have been observed to be negative and statistically significant in numerous previous studies.[9] Such results have been interpreted in some quarters as evidence of negative value associated with such qualifications. This in turn has led to claims that the training in question must be of very low value. However, if we remember that the true return that we want to estimate is the gain in wages a particular individual receives upon acquiring a qualification, compared to that same person's situation without the qualification, then it seems unreasonable to think that this person would actually be *personally worse off* after acquiring the qualification, and would have been better off without it. At worst, qualifications might have a zero impact, but it is difficult to imagine how they might have a negative effect.[10] An alternative explanation of negative estimated returns is that the estimates have been biased downwards by some of the factors described in the previous sub-section. Indeed, if we argue that the worst possible *true* return is zero, then the size of the estimated negative returns provides a lower bound for the extent of the negative bias.

A major aim of this review is therefore to consider what happens to the estimated returns to intermediate vocational qualifications, when the various biases in the estimates are reduced. First, however, we must discuss, in principle, how the biases can be reduced.

Summary

The existence in the literature of negative estimated returns to intermediate vocational qualifications may be taken as evidence of a downward bias in such estimates, under the assumption that an individual's wages cannot actually *fall* following the acquisition of a qualification, so that the worst return we might expect in practice would be zero.

2.4 Reducing the Bias in Estimated Returns

2.4.1 Specific Control Groups

As mentioned in Chapter 2.1 above, the traditional concern in the academic rate of return literature has been an upward bias in the estimated returns, caused by unobserved

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[9] See, amongst others, Dearden *et al*. (2002) and McIntosh (2002).
[10] It is not impossible to explain a negative effect, for example, if an individual actually *lost* skills, while training to acquire new ones. However, such a situation is likely to be quite rare, and certainly not the norm required to provide an overall negative impact on average.

ability, or some other unobserved characteristic that is positively correlated with both qualification acquisition and wages. Various methods have been adopted in the literature to reduce or remove such bias.[11] The most direct method is to control for the selection variable, such as ability, if data are available for example in the form of test scores. It is debatable, however, how well ability can ever be accurately measured. Other methods have used Instrumental Variable techniques to isolate random variation in education amongst the sample members, or made use of samples of identical twins and looked at variation in education and wages within pairs of twins, on the argument that natural genetic ability will be held constant within the pair. Often, however, data are not available to pursue any of these methods. It has often been argued, for example, that the Labour Force Survey[12] contains no measure of ability, no natural instrument for qualification acquisition, and no sample of twins. Alternative methods of controlling for unobserved effects therefore need to be found.

The cause of the downward bias, as described in Chapter 2.2 above, is that the control group of individuals without intermediate vocational qualifications will be very different to the treatment group of individuals who acquire such qualifications, and differences in their wages could be due to differences in those characteristics rather than being due to the latter group holding the qualifications. For example, there is likely to be a much larger proportion of the control group holding good academic qualifications such as 5 or more good GCSEs or A levels than amongst individuals who hold intermediate vocational qualifications, since the pursuit of the latter qualifications is less likely if individuals already hold the former. While formal qualifications are observed and so can be controlled for, other factors correlated with the acquisition of such qualifications (such as ability, motivation, work history etc) will be unobserved and so not controlled for.

Attempts have been made in the literature to control directly for the differences between individuals who hold intermediate vocational qualifications and individuals who do not. Prominent amongst these is Dearden *et al*. (2004) who focus on NVQ2s. Using data from the BCS[13], they include direct control variables for individuals' ability, as measured by childhood test scores,[14] and family background, as measured by parents' years of schooling, father's social class at age 10, and gross family income at age 10. The inclusion of such variables is shown to reduce the size of the estimated negative returns to NVQ2, but these do still remain negative and statistically significant. The authors say that 'one potential explanation for our inability to find positive returns is that selection into the NVQ2 program is more complicated than we can capture in this analysis. NVQ2

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[11] For a review of such methods, again see Card (1999).
[12] Chapter 3 describes this, and other, data sets that have been used to estimate returns to qualifications.
[13] Again, see Chapter 3 for a description of this data set.
[14] Specifically, copying designs at age 5, and math ability and British Ability Scales score at age 10.

recipients may be less able than their counterparts in ways that are not measured in the data' (page 19).

If the differences between the treatment group with intermediate vocational qualifications and the control group without cannot successfully be controlled for, then a better approach would be to deliberately choose the composition of the control group, so that its members are likely to have more similar observed *and unobserved* characteristics to the treatment group of vocational qualification-acquirers. An obvious way to do this would seem to be to exclude from the control group any individuals with good academic qualifications. Given that we are focussing on intermediate vocational qualification starting at Level 2, a first approach would be to exclude from the control group those who already reached Level 2 via the academic route (i.e. exclude those with 5 or more good GCSEs).

If this approach is adopted, note that it is important to also exclude from the treatment group those individuals with 5 or more good GCSEs (i.e. those with the vocational qualification of interest *and* the GCSEs) otherwise the analysis would have been tipped in favour of the latter. That is, the estimated returns to the intermediate vocational qualification would be biased upwards, since some individuals with the vocational qualification, but no individuals without the vocational qualification by construction of the control group, would have GCSEs and so the unobserved wage-enhancing characteristics that go with them. In order to isolate the returns to a particular vocational qualification, it would also be useful to exclude from the treatment group individuals who have other vocational qualifications at the same level as the qualification of interest. The implication of this is that the analysis will consider only those individuals who have no other qualifications at the same level, and so hold the qualification of interest as their highest qualification.

It could be argued that individuals who acquire some good GCSEs, but fail to achieve 5 or more, could still differ from those with intermediate vocational qualifications in their unobserved characteristics to a sufficiently large extent to still be regarded as an unsuitable control group. It then becomes a question of where we want to draw the line when excluding individuals from the control group. In the extreme, a control group could be constructed consisting of individuals with no qualifications at all. Following the logic of the previous paragraph, the treatment group would in this case be individuals with only the qualification of interest, and no other qualifications. The interpretation of the estimated returns would then be the gain in wages that an individual with no qualifications could expect, if they acquired the vocational qualification of interest.

It should be noted that even the 'no qualifications' group may not necessarily be the best control group. The UK has a relatively large proportion of its workforce with no qualifications, many of whom could be quite highly skilled having acquired their skills through experience and learning on the job, particularly amongst older workers. If this is the case, even compared to individuals with no qualifications, there might still be more favourable unobserved characteristics amongst such a control group than amongst the treatment group with intermediate vocational qualifications, and so the estimated returns to the latter could still be biased downwards.

It was mentioned above, that in the analyses with specific control groups, the returns are effectively estimated on a group for whom the vocational qualification in question is their highest qualification. An additional advantage of estimating such returns to qualifications held as individuals' highest, relative to specific comparison groups, is that they would seem to be more consistent with the most relevant policy questions. Thus, policy-makers are more likely to be interested in an individual with no or only low level qualifications reaching a new higher level of attainment through acquiring an intermediate vocational qualification, rather than in someone who already has a degree, for example. It must be acknowledged, however, that the results derived are strictly speaking only applicable to individuals with low initial qualifications who acquire the vocational qualification as their new highest qualification, rather than being able to be generalised to all individuals with that vocational qualification.[15]

Summary

The potential negative bias on estimated returns to intermediate vocational qualifications discussed in Section 2.2 above is caused by individuals in the treatment group with such qualifications being different to the individuals in the control group without such qualifications, in ways that also affects their wages. When such differences are unobserved they cannot be controlled for, for example in the case of ability or motivation differences which are difficult to measure accurately. In this situation, one solution is to deliberately restrict the control group to individuals who will be more similar, in terms of both their observed and their unobserved characteristics, to the individuals in the treatment group. Under the assumption that wage-enhancing characteristics such as ability and motivation will be positively related to qualification acquisition, then restricting the control group to lower-qualified individuals should ensure the treatment and control group are more similar in terms of their unobserved characteristics.

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[15] The returns to vocational qualifications when *not* obtained as a new highest level of attainment will be discussed in Chapter 13.

The studies reviewed in this report typically use two restricted control groups; first including only individuals with academic qualifications below the level of the vocational qualification being considered and/or with vocational qualifications at or below the level of the vocational qualification being considered; and second, including only individuals with no qualifications in the control group.

If the control group excludes individuals with higher level qualifications, then any individual in the treatment group with higher level qualifications in addition to their intermediate vocational qualification must also be excluded, to maintain a fair comparison. The consequence of this is that the intermediate vocational qualification being considered must be the highest qualification of the individuals maintained in the treatment group. All returns to intermediate vocational qualifications relative to restricted control groups are therefore applicable to situations where those qualifications are held as the highest qualifications of the individuals involved.

2.4.2 Occupation/Industry Specific Estimates

As well as differences in individual characteristics such as ability and motivation, an additional difference between the treatment group who acquire an intermediate vocational qualification and a control group who do not is likely to be the job that they do. In particular, the individuals who acquire intermediate vocational qualifications are likely to be working in lower-paying jobs than individuals with, say, good GCSEs. Would it be correct to attribute this difference in average wages between the occupations worked in, as part of the return to the intermediate vocational qualifications? If the individuals have ended up in the less well paid occupation *because* their qualification attainment is of the intermediate vocational qualification, then the answer to this question would probably be yes. However, in many cases, the causality between qualifications and occupation probably runs the other way for intermediate vocational qualifications. In many circumstances of vocational qualification acquisition, those qualifications will have been obtained because they were required (either by law or for technical reasons) in order to work in a particular sector of the economy that the individual had already chosen. For example, care home workers are required to obtain an NVQ2 qualification. Thus, it is more likely that the individual acquires the qualification *because* of the occupation that they have chosen to work in, rather than vice versa. If this is correct, and if our aim is to determine the pure return to acquiring the vocational qualification for a particular individual, then others without the qualification who are working in different occupations may be thought to be an inappropriate comparison group and their wages a poor estimate of what the first individual would earn if she did not acquire the qualification, because she has already chosen to work in her own particular occupation. Therefore, if

we want to know what the benefit of acquiring a vocational qualification to a particular individual would be, then individuals working *in the same occupation or sector* but without the qualification are the most appropriate comparison group, providing an estimate of the outcome for acquirers if they actually did not acquire the qualification, but remained in that sector.

It has often been argued in the returns to education literature that controlling for occupation (i.e. including variables in the estimated wage equation to indicate occupation, or estimating the wage equation for one occupation at a time), would give an inaccurate estimate of the returns to qualifications. When such statements were made, however, the speaker usually had academic qualifications in mind. Therefore, when estimating the return to a degree, we do not want to control for occupation, because much of the return to the degree is derived from giving the holder access to particular graduate occupations. For example, most of the benefit to obtaining a law degree would be in giving the holder access to the law profession and thus the higher wages on offer than in many other occupations. We would not want to compare the law degree holder's wages to those of other lawyers who might not have degrees, but to the wages of individuals in other occupations to which the holder would have turned if she had not obtained the law degree. Therefore, for such academic qualifications, the qualification comes first, subsequently giving access to the occupation.

As just argued, however, with many intermediate vocational qualifications, the occupation came first, and then having begun to work in that occupation, individuals were required or chose to obtain a relevant vocational qualification. In this case, it would seem that other individuals in the same occupation would provide a good estimate of the counterfactual, that is, the wage of this individual if she had not obtained the qualification *but remained in the same sector*. Limitations of this method include the fact that occupational and industrial classifications in data sets invariably classify jobs that are slightly different into a single classification.

Summary

If individuals who acquire intermediate vocational qualifications were already working in a lower-paying occupation prior to the acquisition, then the wages of individuals without such qualifications who potentially work in higher-paying occupations will not provide a realistic estimate of the wages the first individuals *would have* received had they not acquired the qualification. In this case, lower qualified individuals *working in the same occupation/sector* may provide a better estimate of this counterfactual wage. Sector-

specific returns to intermediate vocational qualifications relative to specific control groups will therefore be considered when the results available in the literature are reviewed.

2.5   Replication of Results

The aim of this review, as stated above, is to look beyond standard estimates of the returns to vocational qualifications, and instead at those that have attempted to reduce the biases involved in the standard estimates. In doing so, attention will be focussed on positive estimates, where the value of vocational qualifications has been demonstrated. It should be acknowledged here, however, that a single result in the literature that goes against the norm cannot be taken as absolute proof that a situation has been found where positive returns to vocational qualifications exist, since any estimated result can always occur occasionally purely by chance. The likelihood of a statistical fluke will also be increased when sample sizes are reduced, as would be the case in some of the analyses of subsamples described in the previous subsection.   It will therefore be important to point out whether any positive results observed in the literature have just been a one-off, or whether they have been replicated with other data sets or at other points in time. When such replication does not exist, then there is an urgent need for such research to be undertaken.

Summary

A result that has been replicated by more than one study in the literature is of greater value than a result without replication, which may have arisen by statistical chance.

3   Data

Before beginning the review of particular studies, it was considered useful to review the datasets and methods used first, to collect those in one place, to put the results in context, and to unclutter the sections that reports the actual results.

In all of the papers reviewed in the following sections, one of three data sets is used; the Labour Force Survey (LFS), the National Child Development Study (NCDS) or the British Cohort Study (BCS). Briefly describing these three data sets, the LFS is a quarterly survey of a large representative sample of the UK population. Each quarter's LFS sample of 60,000 private households is made up of 5 'waves', each of approximately 12,000 households so that the QLFS has a rotating panel element where each wave is interviewed in 5 successive quarters. In any one quarter, one wave will be receiving their first interview, one wave their second, and so on, with one wave receiving their fifth and

final interview. Each quarter produces a sample of around 75,000 individuals of working age. However, for the purposes of estimating wage equations, information about wages is only asked of individuals in their first and fifth wave, so only these observations can be used. Researchers typically merge the quarterly data sets together to produce annual data sets, and often merge these annual data sets together too, in order to obtain large sample sizes. To avoid double counting of individuals, this requires using just one of their appearances in the survey[16]. Thus, in these merged datasets, each quarterly survey provides about 15,000 observations[17], of whom about half will be in work and report valid wage information. The LFS has detailed information on all of the qualifications held by individuals, but only a limited number of background characteristics to be used as control variables, typically gender, age, ethnicity, region, workplace size and public/private sector. The big advantage of the LFS is the large sample sizes it produces, particular when years are merged together. This allows greater disaggregation of the data, for example looking at particular sectors or regions of the economy. The disadvantage of the LFS is the relatively small number of background characteristics of respondents on which it provides information.

The NCDS and BCS are both birth cohort data sets. These have been obtained by following two particular cohorts of individuals with repeated surveys throughout their lives, from birth to the present day. The NCDS cohort has surveyed all individuals born in the UK in a particular week in 1958, with the BCS doing the same for a particular week in 1970.[18] The big advantage of using the birth cohort data sets is the vast amount of information on the respondents' lives that they provide. In particular, compared to the LFS, the birth cohort data sets provide information on family background when the respondents were growing up, as well as literacy and numeracy tests as measures of ability. Since these variables are all likely to affect both qualification achievement and wages, it is very useful to be able to control for them and so prevent the biases that would be caused by their omission.

The evidence to be reviewed will be for Britain, unless otherwise stated. One paper in particular that is reviewed in detail below is for England only (Jenkins *et al.*, 2007)

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[16] Typically wave 1 is used rather than wave 5, since a number of individuals drop out the survey before their 5th appearance.
[17] 75,000 working age individuals, with one-fifth of these being in their first wave.
[18] More correctly, they have 'attempted to survey', since not all the relevant individuals respond to requests to complete the surveys.

Summary

All of the studies reviewed in this report use one or more of three data sets. These are the Labour Force Survey (LFS), the National Child Development Study (NCDS) and the British Cohort Study (BCS).

The LFS contains information on labour market outcomes and background characteristics for a large sample of individuals. It has a short longitudinal component in that respondents are included for five consecutive quarters, though it is mostly used as a cross-sectional data set, taking only individuals' first appearance in the survey, and often merging quarterly surveys to produce larger data sets.

The NCDS and BCS are both birth cohort data sets, which means they have followed and repeatedly surveyed a cohort of individuals throughout their lives, the former born in 1958 and the latter in 1970. The birth cohort data sets have the benefit of large amounts of data on the individuals from all parts of their lives, to provide extensive controls for background characteristics. On the other hand, they have smaller sample sizes than the LFS, and results are strictly speaking only applicable to the cohort of individuals being followed.

4   Methodology

This section discusses the econometric methodologies that have been used in the literature to estimate returns to qualifications. The section will end with a discussion of what the ideal methodology to answer the question posed in the Introduction would look like.

4.1 Ordinary Least Squares

As discussed in Chapter 2, because we cannot observe the same individuals at the same point in time both with and without a particular qualification, we need to use the wages of individuals without the qualification to provide an estimate of how much those with the qualification *would have* earned if they did not have it. This comparison of the wages of individuals with and without qualifications is typically done with regression analysis, allowing researchers to control for observed differences between the two groups. The discussion in Chapter 2.4.1 regarding specific comparison groups can easily be applied to regression analysis, simply be limiting the sample on which the regression equation is estimated.

Thus, researchers estimate an Ordinary Least Squares regression of the form shown in equation 1.

$$\ln W_i \quad = \quad \underline{\delta}_j \underline{Q}_{ji} + \underline{\beta}_k \underline{X}_{ki} + \varepsilon_i \tag{1}$$

Where $\ln W_i$ is the log of each individual i's hourly wage rate, Q_{ji} is a vector of j qualifications held by each individual i, and X_{ki} is a vector of k other characteristics of individuals that affect wages and so need to be held constant in the analysis. The δ_j coefficients measure the wage return to each qualification in the Q vector, that is the difference in wages between individuals who hold the qualification and individuals who do not, holding constant their other characteristics that determine their wages. The β_k coefficients measure the impact of these characteristics on wages, though these effects will not be commented on here. The characteristics included in the X vector vary across studies, and depend on the information available in the datasets used. Variables often controlled for include gender, age, ethnicity, region, workplace size and public/private sector. Variables less often controlled for include ability (usually some sort of literacy/numeracy test or occasionally IQ test), motivation, experience, family background, and parental variables such as their education or interest in their children's education. All of these variables are likely to be associated with how many qualifications individuals obtain, but also potentially affect wages too, and so need to be held constant in any comparison.

Problems emerge in such analyses when data are not available to control for all of the other characteristics that one would like to control for. An example might be the motivation of an individual, which would be a difficult variable to measure numerically. If more motivated individuals are more likely to obtain qualifications, and more likely to earn higher wages whether they obtain qualifications or not, then part of any positive association between qualifications and wages may be due to the fact that the individuals with the qualifications were more motivated in the first place, rather than the effect of the qualifications themselves. A similar effect is caused when individuals' ability is omitted, or important dimensions of ability are not included[19]. It was to reduce or remove this problem that the use of specific control groups was proposed in Chapter 2.4.1 above. Another solution to this problem, if data allow, is to estimate the wage equation in first differences.

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[19] As mentioned above, the only ability measures that are usually available, if any at all, are test scores on literacy and numeracy tests.

Summary

The most often used method of estimating returns to qualifications is Ordinary Least Squares (OLS) regression. This allows the researcher to estimate the wage gap between individuals with and without a qualification, holding constant any other characteristic included in the equation that might also influence wages. A problem emerges when characteristics that are correlated with qualifications, and that also influence wages, are unobserved and so cannot be included in the equation or held constant. Examples of such characteristics include ability and motivation. The omission of such characteristics causes the biases on the estimated returns to qualifications that were discussed in Sections 2.1 and 2.2 above.

4.2 First Differenced Equations

First differencing requires the researcher to have data points on the same individuals at two points in time, so that the changes over time are observed. In equation form, the relationship at time t is now:

$$\ln W_{it} \quad = \quad \underline{\delta}_j \underline{Q}_{jit} + \underline{\beta}_k \underline{X}_{kit} + a_i + \varepsilon_{it} \tag{2}$$

where a_i is the unobserved characteristic of the individual such as ability or motivation. Note that this variable does not have a time subscript as it is assumed to be constant over time. If this variable is correlated with both qualifications, Q, and wages, W, then omitting this variable will bias the estimated δ coefficients.

If equation 2 holds at time t, it will also hold at time t-1:

$$\ln W_{it-1} \quad = \quad \underline{\delta}_j \underline{Q}_{jit-1} + \underline{\beta}_k \underline{X}_{kit-1} + a_i + \varepsilon_{it-1} \tag{3}$$

Subtracting equation 3 from equation 2, gives the first differenced relationship, equation 4:

$$\Delta \ln W_{it} \quad = \quad \underline{\delta}_j \Delta \underline{Q}_{jit} + \underline{\beta}_k \Delta \underline{X}_{kit} + \Delta \varepsilon_{it} \tag{4}$$

where Δ is the first-difference operator. Note that because the a_i terms were constant over time, they drop out of equation 4, and so estimates of the coefficients will now be unbiased. The coefficients δ_j now provide an estimate of the *change* in log wages following a change in qualification j status (in practice this means the acquisition of qualification j, since qualifications cannot be taken away). This methodology therefore relies upon the assumption that the unobserved characteristics such as ability and

motivation do not change over time. If this assumption is not true, then the estimated coefficients will still be biased.

Summary

If a researcher has longitudinal data on individuals, so they are observed at more than one point in time, then a first-differenced equation can be estimated, regressing the *change* in wages against the change in qualifications held and the change in any other control variables. The advantage of this specification is that any unobserved characteristics that do not change over time will drop out, since their first difference will be zero, therefore leaving the estimated returns unbiased.

4.3 Propensity Score Matching

Another method that is being increasingly used in the estimation of returns to qualifications is matching. This technique compares the wages of individuals with particular qualifications to the wages of the individuals without such qualifications who look most like the first group of individuals in terms of their observable characteristics. In practical terms, when a large number of characteristics are available to the researcher, this is done by estimating the 'propensity score' for each individual in the data set. The propensity score is the likelihood of the individual being 'treated' (in this case acquiring a certain qualification), based upon their observed characteristics. The wages of individuals who acquire a qualification are then compared to the wages of individuals with a similar[20] propensity score. The matched individuals without the qualification therefore look as though they *should have* obtained the qualification, based on their observed characteristics, but did not for some reason. Their wages are therefore used as an estimate of the wage the qualified *would have* received, if they had not obtained the qualification. The success of the method, of course, relies upon having sufficient data on a wide enough range of variables with which to perform the matching exercise.

Summary

Propensity score matching involves comparing the outcomes of a treatment group to those of a 'matched' control group, in the sense that each individual in the treatment group is matched to the person who looks most like them in the control group, in terms of observable characteristics. Individuals for whom there are no matches are dropped from

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[20] 'Similar' is defined in a statistical sense according to the method of matching used. This could be 'nearest neighbour' matching, for example, where the untreated individual with the closest propensity score (up to a certain cut-off point) is used, or kernel matching, which uses all untreated individuals, inversely weighted by a function of the difference between their propensity score and that of the treated individual.

the analysis. In terms of the subject of this review, the outcome variable would be wages, and the treatment would be the acquisition of an intermediate vocational qualification.

4.4 'Highest Qualification' versus 'All Qualification' Specifications

As well as the econometric techniques discussed above, the measurement of qualifications is also an important aspect of the methodological approach used. All of the data sets, discussed above, that have been used in the reviewed papers, have information on all of the qualifications held by individuals. Two methods of using this information have typically been adopted in the literature. First, only the individuals' highest qualification is used in the estimated equation. In this case, a dummy variable[21] for each qualification is included in the estimated wage equation, only one of which can take the value of 1 for each individual. One qualification category, typically holding no qualifications, is omitted to form the reference category. The interpretation of the coefficient on each qualification variable is then the estimated difference in wages between an individual who holds this qualification as their highest, relative to an individual with no qualifications (the reference category), holding constant all other characteristics controlled for in the equation.

In actual fact, most of the papers reviewed in the following sections include separate variables for individuals' highest vocational qualification *and* their highest academic qualification. This is preferable, as it avoids returns to the two types of qualifications being conflated. The interpretation of the estimated coefficient on a vocational qualification is therefore the estimated returns to that qualification relative to holding no *vocational* qualifications (the reference category), controlling for or holding constant any academic qualifications held.

Although, at least until recently, not described as such in most studies, such a 'highest qualification' specification provides us with an estimate of the marginal returns to the qualification. Note these returns are 'marginal' in the sense of a marginal learner, that is someone who has *just* reached that level of attainment, but has gone no further. They are *not* marginal returns in the sense of the change in wages from acquiring the last qualification obtained, since the coefficient measures the sum of the returns to *all* qualifications the individual has acquired, up to and including the highest. In order to obtain an estimate of the marginal return in this latter sense, one would need to subtract the returns to having one level lower as the highest qualification. For example, imagine an individual has only followed the traditional academic route, and has obtained GCSEs, A levels and a degree. The coefficient on the degree variable in a 'highest qualification'

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[21] A dummy variable can only take the value 0 or 1.

specification would give an estimate of the total returns she could expect, on average, to all of these qualifications. The difference between the coefficient on the degree variable and the A level variable would be an estimate of the additional, i.e. marginal, returns she could expect from obtaining a degree on top of her previous qualifications. Note, however, that such a procedure would be much less appropriate for the vocational qualifications that will be the main focus of this review. Academic qualifications are almost always studied in a strict hierarchy, thus facilitating this comparison of returns to each level of attainment. It is very difficult to undertake academic study at a particular level without having achieved at the preceding level, and also very rare to undertake academic study at a particular level having already achieved at a higher level. It is therefore reasonable to assume that individuals at a particular level of academic attainment have already attained at the preceding levels, and to assume that the order of acquisition followed the linear hierarchy. As discussed above, however, vocational qualifications are not necessarily acquired in this linear way, but rather often acquired when required by, and at the level required by, their job. It is therefore not always the case that a vocational qualification is adding on to a lower level of attainment, and so the return to the lower level of attainment cannot simply be subtracted to determine what a qualification at a higher level will add to earnings.

The alternative to the 'highest qualification' specification is to include all qualifications held by individuals. The wage equation would look apparently the same as the earlier specification, with one dummy variable for each qualification. In this case, however, the qualification variables will take the value of 1 for *every* qualification that a particular individual holds. The interpretation of a coefficient on a qualification variable in this case is then the estimated average difference in wages between all individuals who hold that qualification, and all individuals who do not, holding constant other qualifications acquired and all other background characteristics controlled for in the equation. This specification therefore estimates the *average* returns to a qualification across all individuals who hold that qualification, whether or not they have gone on to acquire higher qualifications, and whether or not they already held qualifications at the same or even a higher level. They are therefore called *average returns*. Estimated returns in such a specification are cumulative, that is they can be summed across qualifications to provide an estimate of the total returns to combinations of qualifications.

Finally, note that some of the analyses reviewed below estimate a specification that is a hybrid of the 'highest qualification' and 'all qualifications' specification. Such specifications only consider the treatment group to be those individuals who hold the qualification of interest as their highest qualification, but then also control for all other qualifications held below this level. The interpretation of the estimated coefficient is then

the estimated difference in wages between holding and not holding the qualification of interest, but applicable only to those situations where an individual with initially low level qualifications acquires the qualification of interest as their new highest qualification.

Summary

The data sets used by the studies reviewed in this report contain information on all of the qualifications held by individuals. This allows researchers to estimate two different specifications for the wage equation, one including all of the qualifications held by each individual, and the other including only the highest qualification held by each individual.

The highest qualification specification estimates the returns to each qualification based on the individuals who have, by definition, just reached that level and gone no higher. Such returns are therefore known as *marginal* returns. The estimated return actually measures the cumulative return to all qualifications obtained up to and including the highest.

The 'all qualifications' specification estimates the returns to each qualification, averaged across all individuals who hold that qualification, whether it is their highest qualification or not. Such returns are therefore known as *average* returns. The estimated return measures the average wage difference between those holding and those not holding the qualification, controlling for all other qualifications held and for the other observed characteristics included in the equation.

Many of results from the literature reviewed in this report utilise a hybrid of these two approaches, particularly the results reviewed in Section B. These are the results where specific, lower-qualified control groups are used. Such specifications estimate returns to an intermediate vocational qualification only for those individuals holding it as their highest qualification, but also including in the specification all other qualifications held below this level.

4.5 The '*Ideal*' Methodology

Before leaving this section, it is worth considering the ideal methodology that would, if data were available, answer the question posed above. There are always going to be problems, when the only data available are of a cross-sectional nature. The only way to estimate the returns to qualifications with such data is to compare the wages of those with the qualification to the wages of those without, and control for as many other differences between the two groups of workers as possible. Longitudinal data, whereby

the same individuals are followed over time, would seem to be more appropriate, as some characteristics of individuals, such as motivation, are always going to be unobserved no matter what quality of data are available. Having longitudinal data therefore allows the possibility of estimating first differenced equations, whereby unobserved characteristics that remain fixed over time will be differenced out of the equation. Longitudinal data collection that was repeated frequently enough and a sufficient number of times would also have the advantage of allowing the researcher to build up life histories of the individuals. This in turn would provide the researcher with detailed knowledge of the point of acquisition of each qualification, the qualifications already held at the point of acquisition of a new qualification, the timing of job changes, etc. If wages before and after the acquisition of the qualification are observed, the change in wages for such individuals could easily be calculated. In order to attribute this change in wages to the qualification acquisition itself, it would be necessary to control for any other characteristics of the individuals that had changed. To control for external factors that may be changing over time and causing the change in wages, the change in wages of those who acquire a qualification should be compared to the change in wages of individuals who do not acquire the qualification, in a difference-in-differences framework. The two groups should of course be as similar as possible in terms of their observable characteristics, including doing the same job. Any unobservable characteristics will hopefully be fixed over time and so be differenced out. Various disaggregations could be undertaken with this methodology, for example whether the qualification acquisition was at a new highest level of attainment or whether at a level already attained, type of qualification, etc.

There are no data sets currently available in the UK that fulfil this ideal perfectly. The birth cohort data sets have obviously followed a group of people throughout their lives. However, they only represent a single cohort of individuals, and so any results obtained are, strictly speaking, only applicable to that cohort of individuals, and the time that they were observed in the labour market. Furthermore, the birth cohorts have not been surveyed frequently enough to build up the detailed lifetime histories described above. Between one sweep of data collection and another, individuals may have acquired multiple qualifications, so that it would not be clear which qualifications were already held when new ones were acquired. Panel data sets such as the British Household Panel Survey solve both of these problems of the birth cohort data sets, though at the expense of relatively small sample sizes, so that few disaggregations would be possible. The best source of data for the above analyses would therefore seem to be administrative data, which will likely cover a cross-section of individuals of all ages, be updated frequently,

and provide sufficiently large sample sizes. The current attempts by the DCSF/DIUS to merge learner records with tax records therefore provide some hope in this area.

Summary

Using cross-section data to examine the difference in wages between those with and without a qualification, in order to estimate the gain in wages that would be received by those acquiring the qualification, will always be subject to potential bias due to unobserved differences between those with and without the qualification. Longitudinal data will provide a better estimate of the change in wages for the same individual following his or her acquisition of a qualification, because the same individual is observed in the data at the two points in time before and after the acquisition. Such 'wage-change' of first differenced specifications also have the added advantage that unobserved characteristics that vary between those with and without the qualification, but which do not vary over time, will be differenced out of such equations, since their change over time is zero. They therefore cannot bias the results.

The longitudinal data sets used by the studies reviewed in this report are the two birth cohort data sets, described in Chapter 3 above. Whilst very useful, they do suffer from two problems, in that any results obtained from them are strictly speaking only applicable to individuals in those birth cohorts, and that respondents are only interviewed infrequently with a number of years interval between interviews. The British Household Panel Survey solves both of these problems by interviewing respondents of all ages every year. However, its sample size is quite small, so that it observes few adults acquiring qualifications from one year to the next. Administrative data on qualification acquisition matched to administrative pay records, with background characteristics from one of the sources, would be the ideal data set for evaluating the impact on a particular individual's wages of his or her acquisition of a new qualification.

Part B: Marginal Returns to Intermediate Vocational Qualifications Relative to Specific Control Groups, and First-Difference Results

In this part of the report, we review the various studies that have estimated the returns to intermediate vocational qualifications when held as individuals' highest qualification, relative to specific comparison groups. Throughout, we will emphasise the positive results that have been obtained for the returns to intermediate vocational qualifications. Doing so highlights the circumstances where such qualifications have been successful in providing economic value. It can then be discussed whether the success in these particular circumstances can be extended to other circumstances.

The first results to be reviewed consider the returns averaged across all individuals holding each intermediate vocational qualification of interest, acknowledging that individuals holding such a qualification as their highest qualification still represent only a subsample of all such attainment, with many intermediate vocational qualifications not held as highest qualifications. In all sections in this Part B of the report, the returns are estimated relative to specific comparison groups[22], to control as far as possible for unobserved differences in the characteristics of individuals with and without the qualifications of interest. Subsequent sections will then consider sub-samples of this aggregate group, in order to identify any circumstances in which the estimated returns to intermediate vocational qualifications are more positive. The particular disaggregations reviewed will consider estimated returns to intermediate vocational qualifications by route of acquisition, by industry/occupation, by ability, and by age of acquisition.

5   Marginal Returns to Intermediate Vocational Qualifications Relative to Specific Qualification Comparator Groups

5.1   NVQs

Considering first the estimated returns to NVQ2 when that qualification is held as individuals' highest qualification and so is their first Level 2 qualification, the key results found in the literature are shown in Table 1 below. The results were estimated separately for men and women. The comparison group is always also gender specific, that is males

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[22] The exception is the longitudinal evidence on qualifications obtained as an adult, in Chapter 9.

with the intermediate vocational qualification are always compared to males without, and similarly for females.

Table 1: Returns to Vocational Qualifications as Highest Qualifications

	Qualification	Control Group	All	Male	Female
Dearden *et al.* (2004) BCS	NVQ2	No quals	-	**3**	-5
Dearden *et al.* (2004) LFS	NVQ2	No quals	-	-0	**3***
Jenkins *et al.* (2007) LFS	NVQ2	No quals	**4***	**1**	**5***
Dearden *et al.* (2004) BCS	NVQ2	L1 and below	-	-6	-4
Dearden *et al.* (2004) LFS	NVQ2	L1 and below	-	-6*	-1
Jenkins *et al.* (2007) LFS	NVQ2	L2 voc and below	**2***	-1	**3***

Notes: 1. The returns reported here are calculated as $e^{\beta} - 1$, where, β is the estimated coefficient in the log-linear wage equation.
    2. * statistically significant at the 5% level or better
    3. '-' indicates that the figure is not provided in the original paper.
    4. Positive estimates shown in bold, non-positive in gray.

Dearden *et al*. (2004) first use the BCS data set with its rich set of controls, allowing them to control for ethnicity, region, employer size and type, ability and family background (their Tables 7 and 8). Relative to men with no qualifications, those with an NVQ2 as their highest qualification earn on average 3% more, although this number is highly statistically insignificant. The estimate for women is -4.5%, and is again statistically insignificant. Thus, even compared to individuals with no qualifications at all, there is little evidence for a positive return to NVQ2 in this aggregate analysis, across all individuals in these circumstances. Relative to a comparator group with no qualifications *or* Level 1 qualifications, the marginal return to an NVQ2 for males falls to -6%, while the marginal return for females is virtually unchanged at -4.5%, both estimated coefficients again being statistically insignificant.

Dearden *et al*. (2004) also use LFS data (1996-2002) with its larger sample size, allowing them to estimate the above marginal effects with greater precision, though at the cost of no longer being able to control for family background and ability (their Tables 14 and 15). When they do this, they find male marginal returns to an NVQ2 of -0.2% compared to men with no qualifications at all (therefore essentially zero difference and clearly

statistically insignificant), and of -5.5% (statistically significant) compared to men with no qualifications or Level 1 qualifications. The equivalent figures for the female marginal returns are 3% (statistically significant) and zero respectively. Thus in the LFS at least, though not in the BCS, Dearden *et al.* find a positive and statistically significant, though small, return to holding an NVQ2 as their highest qualification, across all women in such circumstances, relative to women with no qualifications at all.

Jenkins *et al*. (2007) also estimate similar specifications to those of Dearden *et al.* (2004), using LFS data from 1997-2006[23]. The results, relative to a comparison group with no qualifications at all, are shown in their Table 18, and are repeated in our Table 1 above. They find that individuals who have an NVQ2 as their highest qualification earn on average 4% more than individuals with no qualifications, this effect being statistically significant (5% and statistically significant for females, and 1% and statistically insignificant for males). These results are therefore very similar to the Dearden *et al.* (2004) LFS results for the same specification. It would appear that, for females at least, a woman with no qualifications will benefit from the acquisition of an NVQ2, on average across all sectors, acquisition routes, ability levels etc.

The second comparison group considered by Jenkins *et al.* (2007) is individuals with at most Level 1 academic qualifications or other Level 2 vocational qualifications (i.e. other than the NVQ2) (their Table 11). For individuals whose highest qualification is an NVQ2, relative to the new comparator group just mentioned, the return to the NVQ2 is 2% and statistically significant (3% for females and -1% for males, the former being statistically significant). Thus, the marginal returns to NVQ2 are slightly lower when we admit individuals with other Level 2 vocational qualifications or Level 1 academic qualifications into the comparator group (relative to the returns with a comparator group of individuals with no qualifications at all), and so are now very small, though at least they are positive and statistically significant overall, a result that is clearly being driven by positive results for women rather than for men.

Therefore, when restricting the control group to individuals who have no or only low level qualifications, which it can be argued is a more relevant group to compare to NVQ holders, then the results reveal that positive economic value is obtained by those who hold NVQ2 as their highest qualification. Such estimates therefore reduce the negative biases that are likely to affect estimates of returns to intermediate vocational qualifications, that were discussed in Chapter 2.2. However, it is still likely that some bias will remain, since even the 'no qualifications' group are a diverse group, who will include

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[23] As mentioned in the Introduction, Jenkins *et al.* (2007) use data for respondents living in England only, unlike other paper reviewed here which use British data.

some skilled and experienced workers.[24] Attempts to reduce the bias further will be considered in subsequent sections, for example, comparing individuals in the same occupation (see Chapter 8 below). Other methodologies that could be used, but have not been attempted in the papers under review, is to restrict the control group to younger workers, under the assumption that the skilled and experienced individuals found in the 'no qualifications' group are likely to be older.

In order to understand the importance of these results, it is useful to determine how many NVQ2s are obtained as individuals' highest qualifications, and how many such individuals came from the control groups considered here. The analysis of 2008 Labour Force Survey data by the author shown in Appendix A suggests that around one-half of all individuals who hold an NVQ2 have no academic Level 2 qualification and at best Level 2 vocational qualifications. Further analysis of the 2008 LFS reveals that of all individuals holding an NVQ2, 11% have no other qualification at all. Therefore, although the situations described here are relevant to a minority of all instances of NVQ2 acquisition, they do constitute a significant minority, particularly when the control group is expanded to include individuals with qualifications at Level 1.

Summary

This section restricts the control group of non-NVQ holders, to make them more comparable to those who acquire NVQ2, and so reduce any negative bias on the estimated returns. When individuals who hold NVQ2 as their highest qualification are compared to individuals who either (i) hold no qualifications, or who (ii) hold at best Level 1 academic or other Level 2 qualifications, then positive wage differentials in favour of the NVQ2 group are observed (4% and 2% respectively in the most recent evidence). When disaggregated by gender, it is found that it is only women who are receiving these positive wage differentials.

These results suggests that using full sample estimates of wage premiums to NVQ2s, that have typically produced negative values, does not give an accurate estimate of the economic value of such qualifications to the individuals who acquire them, due to negative biases caused by differences in characteristics between individuals with and without such qualifications.

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[24] As an illustrative example of this, the average wage amongst individuals with no qualifications is higher than the average wage amongst individuals in unskilled jobs ('elementary occupations', SOC 9) (£7.44 versus £6.70 per hour, LFS07).

5.2   Other Intermediate Vocational Qualifications

Dearden *et al.* (2004) and Jenkins *et al.* (2007) also consider all intermediate vocational qualifications, not just NVQ2. Their results are reported in our Table 2 below.

Table 2: Returns to Vocational Qualifications as Highest Qualifications

	Qualification	Control Group	All	Male	Female
Dearden *et al.* (2004)	BTEC Level 2	No quals	-	**23***	**14***
	City & Guilds Level 2	No quals	-	**20***	**5***
	RSA Level 2	No quals	-	**9**	**22***
Jenkins *et al.* (2007)	BTEC Level 2	No quals	**11**	-5	**36***
	City & Guilds Level 2	No quals	**7***	**5**	**10***
	RSA Level 2	No quals	**20***	**60***	**16***
Dearden *et al.* (2004)	BTEC Level 2	L1 and below	-	**8***	**6***
	City & Guilds Level 2	L1 and below	-	**14***	**3***
	RSA Level 2	L1 and below	-	-2	**18***
Jenkins *et al.* (2007)	BTEC Level 2	L2 voc & below	**13***	**13***	**13***
	City & Guilds Level 2	L2 voc & below	**7***	**5***	**7***
	RSA Level 2	L2 voc & below	**16***	**13**	**17***

Notes: 1. The returns reported here are calculated as $e^{\beta} - 1$, where, β is the estimated coefficient in the log-linear wage equation.
2. * statistically significant at the 5% level or better
3. '-' indicates that the figure is not provided in the original paper.
4. Positive estimates shown in bold, non-positive in gray.

Although the estimated returns differ somewhat across the two studies due to small sample sizes, showing that the results are not particularly robust, both studies clearly show that the marginal returns to other Level 2 vocational qualifications, relative to individuals with no qualifications, are generally higher than for NVQ2. Thus, taking

Dearden *et al.*'s results as an illustration as they appear less erratic, in this specification, the marginal returns to City and Guilds Craft/part 2 are 20% for males and 5% for females. For BTEC First/General Diplomas, the returns are 23% for males and 14% for females. The gender pattern in the estimated marginal returns to RSA Diploma qualifications is reversed, with results of 22% for females and 9% for males, the latter being statistically insignificant.

Relative to the second comparator group that includes individuals with low level qualifications, the returns are, as expected, slightly smaller, though all remain statistically significant. Thus, the marginal return to BTEC First/General Diplomas is estimated to be 8% for men and 6% for women. For City and Guilds Craft/part 2, the marginal returns are 14% for males and 3% for females. Finally, for RSA diplomas, a positive return is only observed for females, being 18%.

It is therefore clear that NVQ2s attract a lower return than other Level 2 vocational qualifications, looking at the average figures across all people holding such qualifications as their highest qualification. We can only speculate why this might be, though one possible reason is that other vocational qualifications provide more general skills that can be applied in a wider range of jobs, compared to NVQs which have good returns in some particular sectors (as will be seen in Chapter 8), though do not provide skills that are applicable across a wider range of sectors. If this is correct, then this suggests NVQ qualifications should include more training in more general skills. Another possible explanation is that the other vocational qualifications in Table 2 are more likely to be taken by young people completing their initial education, whereas NVQs are more likely to be taken by low-skilled adults.

Finally in this section, we report that Jenkins *et al.* (2007) derive similar estimates of marginal returns to Level 3 vocational qualifications, relative to specific comparator groups. In this case, the single comparator group is individuals with at best Level 3 vocational qualifications and at best Level 2 academic qualifications. The results of this exercise, shown in their Table 33, reveal healthy marginal returns across the board to Level 3 vocational qualifications. In addition, all results described in this paragraph are statistically significant. An NVQ3 qualification, when obtained as an individual's highest qualification, is associated with a wage return of 11% (10% for females and 13% for males), relative to the comparison group just described. It is therefore clear that acquiring an NVQ at Level 3, when one's previous highest qualification was below this level, yields a good return to individuals of both genders, to an extent that was not observed for NVQ2 in aggregate. Other Level 3 qualifications are similarly beneficial in terms of their marginal wage returns, namely BTEC Nationals at 18% (16% for females

and 17% for males), City and Guilds Advanced Craft/Part 3 at 17% (5% for females and 17% for males), ONC/OND at 25% (14% for females and 26% for males) and RSA Advanced Diploma at 16% (19% for females and 10% for males). Thus, NVQs again earn a lower return than other vocational qualifications at the same level, though the NVQ returns are not so far out of line at Level 3 than was observed previously at Level 2.

Summary

Estimated returns to other vocational qualifications at Level 2 are noticeably higher than the estimated returns to NVQ2 in Chapter 5.1. There are clear differences in the returns to different qualifications by gender, with males benefitting more from BTEC and City and Guilds qualifications, whilst females benefit more from RSA qualifications. Relative to a control group with no qualifications, the 'dominant gender' for each of these Level 2 qualifications earns a wage premium in excess of 20%. When individuals with Level 1 qualifications are added to the control group, the returns are lower though still relatively large and statistically significant, with the same gender pattern as before. At Level 3, all estimated returns are higher than at Level 2, with NVQs again being outperformed by other vocational qualifications. It is speculated that the difference in estimated returns between NVQs and other vocational qualifications is due to the more general education and training provided by the latter, and/or to the different characteristics of the two groups of individuals, with those who acquire NVQs having unobserved characteristics that are associated with lower employability in the labour market.

6 The Marginal Returns to Intermediate Vocational Qualifications, by Acquisition Route

6.1 NVQs

One of the first occasions in the literature when strong positive returns to Level 2 NVQs were estimated was Dearden *et al.* (2004), when they considered different routes to vocational qualification acquisition, using LFS data from 1996-2000. In particular, they included separate variables in the wage equation to indicate an NVQ2 taken exclusively at an employer, taken at a school or college, taken through government training, or via some other route. The results are contained in Table 24 and Table 25 in the Dearden *et al.* (2004) report, with the key findings shown in our Table 3 below[25].

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[25] Unlike our earlier Tables 1 and 2, negative estimates of returns to NVQ2 are included in Table 3, to highlight the difference in the available returns across different acquisition routes.

Table 3: Returns to NVQ2s as Highest Qualifications, By Acquisition Route

	Qualification	Route	Control Group	All	Male	Female
Dearden *et al.* (2004)	NVQ2	Work	No quals	-	**7***	**6***
	NVQ2	College	No quals	-	-8*	0
	NVQ2	Govt train	No quals	-	-29*	-13
Jenkins *et al.* (2007)	NVQ2	Work	No quals	**10***	**12**	**9**
	NVQ2	College	No quals	-1	-3	0
	NVQ2	Govt train	No quals	-12	-13	-13
Dearden *et al.* (2004)	NVQ2	Work	L1 and below	-	**2**	**2**
	NVQ2	College	L1 and below	-	-12*	0
	NVQ2	Govt train	L1 and below	-	-25*	-18*
Jenkins *et al.* (2007)	NVQ2	Work	L2 voc & below	**10***	**9***	**10***
	NVQ2	College	L2 voc & below	**7***	**1**	**9***
	NVQ2	Govt train	L2 voc & below	-2	-11	**5**

Notes: 1. *The returns reported here are calculated as $e^{\beta} - 1$, where, β is the estimated coefficient in the log-linear wage equation.*
2. ** statistically significant at the 5% level or better*
3. *'-' indicates that the figure is not provided in the original paper.*
4. *Positive estimates shown in bold, non-positive in gray.*
5. *The estimated returns in this case are measured relative to not holding the NVQ2 at all (rather than, for example, to holding an NVQ2 through a different route).*

The results show that NVQ2s are most valued in the labour market if they are acquired through an employer. For males, compared to other males with no qualifications, an NVQ2 obtained as a highest qualification at an employer is associated with 7% higher wages. The equivalent figure for females is 6%. No other route of delivery is associated with a positive and statistically significant return for an NVQ2 for either gender (indeed they are negative and statistically significant for men). Relative to a comparison group of individuals with either Level 1 qualifications or no qualifications, the return to an NVQ2

acquired through an employer falls to 2% for both genders and is statistically insignificant in each case. The estimated returns to the other routes remain negative, and statistically significant in many cases.

Such analysis has not been replicated in the literature to a large extent. However, a very similar analysis, for highest qualification relative to specific comparison groups, by acquisition route, was undertaken by Jenkins *et al.* (2007, their Table 58), with the estimated returns being even larger. Relative to a group with no qualifications, they replicate the Dearden *et al.* (2004) finding, that NVQ2 qualifications are most valued when delivered through work, with a statistically significant 10% return observed. Separating by gender, this is 9% for females and 12% for males, though neither estimate is statistically significant due to small cell sizes. Other routes are again associated with lower wages, though effects are not statistically significant. As Dearden *et al.* (2004) also found, NVQ2s provided through government training is particularly associated with lower wages, though the likely cause of this is the unobserved characteristics of individuals who undertake government training, rather than the NVQ itself.

When the comparison group is altered to also include individuals with Level 2 vocational qualifications or Level 1 academic qualifications (Jenkins *et al.*, 2007, Table 57), the advantage to obtaining an NVQ2 through work is observed for males only, who earn a premium of 9% via this route. For females relative to this comparison group, the return to an NVQ2 does not differ significantly across acquisition route, with all routes leading to a wage premium with an average value of around 9%.

A limitation of the acquisition route estimates is that the cell sizes are considerably smaller, though not restrictively so. This is because acquisition route is only recorded in one quarter of the LFS (the spring quarter) per year. Jenkins *et al.* (2007) report cell sizes, with for example 620 individual observations in their data set holding an NVQ2 as their highest qualification obtained through work.

This limitation notwithstanding, acquisition route does seem to have a role to play in explaining variation in the returns to intermediate vocational qualifications, and is certainly an area where more research should be directed. In particular, employers seem to value training more highly when it has been provided in a work setting[26]. There are therefore quite reasonable returns to NVQ2, when that qualification is the individual's new highest qualification and the training for the qualification is provided in a work-setting.

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[26] We cannot tell from the data whether the qualification was acquired after training in the current firm, or in a previous firm.

Analysis of 2008 Labour Force Survey data suggests that the work route is the most popular way to acquire NVQs, as was intended. Of those individuals with NVQ2 as their highest qualification, 38% obtained their qualification solely at their place of work, compared to 35% solely through an education institution, 22% through both work and college, 3% 'some other way' and 1% 'don't know'.

Summary

Evidence suggests that there is significant variation in the estimated returns to intermediate vocational qualifications according to their acquisition route, with qualifications obtained through employers at work showing the highest economic value. In particular, individuals who obtain NVQ2s as their highest qualification through employers earn around 10% more on average than individuals with no or only low level qualifications. Further study is required to understand why NVQs acquired through employers offer a higher return, and whether such value can be provided by NVQs acquired through other routes, or whether the apparent low value of other routes is an outcome of negative bias caused by the unobserved characteristics of individuals who follow such routes, particularly government training.

6.2   City and Guilds Craft/Part 2

The only other intermediate vocational qualification for which estimates of returns by acquisition route are available are City and Guilds Craft/part 2, discussed by Dearden *et al.* (2004) and Jenkins *et al.* (2007)[27]. When the comparison group is individuals with no qualifications at all, Dearden *et al.* find that the returns to a City and Guilds Craft/Part 2 are highest when taken at a college for males, but through work for females. Jenkins *et al.* (2007) find the exact opposite, with the returns highest through work for males, and via college for females, though none of their results show statistically significant different results across routes. This is likely due to the small cell sizes, when the 'no qualifications' comparison group is used.

When the comparison group is altered to also include individuals with other Level 2 vocational qualifications or Level 1 academic qualifications, Dearden *et al.*'s results become consistent across genders, with the employer route leading to highest returns in both cases (8% for males and 16% for females). For this comparison group, Jenkins *et al.* find there are significant returns to City and Guilds Craft/Part 2 qualifications, whatever

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[27] Cell size in the latter study in this case was just 42 individuals obtaining City and Guilds Craft/Part 2 exclusively through work. Cell sizes for other intermediate qualifications' acquisition routes were even smaller still, which is the reason why they were not studied.

the route of acquisition except for government training, with an additional benefit of 14% for males if acquired through work.

Summary

Although the results are not statistically strong, there seems to be some consensus that in most cases, City and Guilds qualifications also have a higher economic value when acquired through work.

7 The Marginal Returns to Intermediate Vocational Qualifications, by Ability

Some studies have attempted to estimate the returns to qualifications separately by ability of the individuals. The motivation is to determine whether vocational qualifications are of higher value to those of lower ability, for example. Such analyses are best done with the birth cohort data sets, as they include childhood test scores as measures of ability. Key results are displayed in our Table 4 below.

Table 4: Returns to Vocational Qualifications as Highest Qualifications, By Ability

	Qualification	Control Group	Low Ability	High Ability
Dearden *et al.* (2004)	NVQ2	No quals	**6**	-35*
	NVQ2	L1 and below	-3	-14*

Notes: 1. The returns reported here are calculated as $e^{\beta} - 1$, where, β is the estimated coefficient in the log-linear wage equation.
2. * statistically significant at the 5% level or better
3. Positive estimates shown in bold, non-positive in gray

Dearden *et al.* (2004) undertake such an analysis by prior ability using BCS data. They define someone as low ability if they scored in the bottom two quintiles of any of the three tests they use (a 'copying designs' test at age 5, and Maths and British Ability Scales tests at age 10). The specification is a 'highest qualification' one, measured relative to specific comparison groups. The results (their Table 10) do reveal evidence that NVQ2s are of more value to low ability individuals, though the results are not strong statistically due to small sample sizes. Relative to a comparison group with no qualifications, a low ability individual with an NVQ2 earns a 6% return, though the estimate is statistically insignificant. Amongst high ability individuals, an NVQ2 is associated with statistically significantly lower earnings. Such negative returns for high ability individuals are pointing

to substantial downward bias in the estimated returns. If a high ability individual decides to acquire an NVQ2 qualification then it is likely that, despite their observed high ability, they have unobserved characteristics that reduce their employability relative to other high ability individuals, or that they have a preference for working in a relatively lower paid occupation where NVQ2s are required. Such effects will be the cause of the downward bias in the estimated returns. Finally, with respect to the wider comparison group of people with no qualifications or Level 1 qualifications, the estimated return to an NVQ2 is negative for both low and high ability individuals.

These results replicate the earlier findings of Dearden *et al.* (2000), who find that the returns to vocational qualifications, unlike their academic counterparts, do vary by individuals' ability, and are about twice as large for low ability individuals, using data from the National Child Development Study.

De Coulon and Vignoles (2008) also present results for low ability individuals only, in their 'lifelong learning' analysis of qualifications specifically acquired between the ages of 26 and 34, using data from the BCS (their Table 9c). The estimation technique is a first-differenced equation, as described in theory in Chapter 4.2 above. They were therefore examining the impact of acquiring an NVQ2 between these ages, on the individuals' *change* in wages between those ages[28]. In this case, low ability was defined as scoring in the lower half in an age 10 maths test. In their first-differenced equation, they find that, when the sample is restricted to low ability individuals only, such low ability women saw a 37% change in their wages between these ages if they acquired an NVQ2, which was statistically significant (40% and statistically insignificant for low ability men). These estimated returns are greater than the full sample (i.e. low and high ability together) results of 25% and 17% respectively. The actual values for the estimated returns do seem quite high, and possible reasons for this will be discussed below in the section using longitudinal data to study the qualifications obtained by adults (Chapter 9). However, the fact that there is a higher value of NVQ2s to lower ability individuals is certainly again demonstrated by these results.

Another approach to investigating variation in returns by ability is to estimate quantile regressions, as is done by Dickerson (2005) using LFS data from 2000 to 2004. Quantile regressions estimate the returns to qualifications at any selected point of the wage distribution, rather than at the mean as in standard regression. For example, standard regression would tell us the difference in average (mean) wages between an individual with and without an NVQ qualification. However, this is only one point of the

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[28] The De Coulon and Vignoles (2008) paper is described in more detail in this review in the section on qualifications obtained by adults, below (Chapter 9).

wage distribution, and there is no reason why the effect of the qualification should be the same at all points of the distribution. The effect of obtaining such a qualification could, for example, be very different for an individual 10% from the top of the wage distribution, compared to someone 10% from the bottom of the distribution. The reasonable assumption made by Dickerson is that those individuals with lower unobserved ability will be located at lower points in the conditional wage distribution. Therefore, the estimated effect of qualification acquisition at the lower quantiles of the distribution provide an estimate of the effect of acquiring qualifications for low ability individuals. However, Dickerson reports that the estimated returns do not differ substantially across the wage distribution, for either academic or vocational qualifications. Thus his results, contrast somewhat with the birth cohort results on ability differences, discussed above, though note that he uses an alternative methodology, and considers all vocational qualifications grouped by level together, rather than examining individual qualifications as the above studies do.

Summary

Although the evidence is not strong, due to difficulties in measuring ability, and low sample sizes in data sets that attempt to do so, most of the available evidence suggests that lower ability individuals receive more economic value from intermediate vocational qualifications. It may be that such individuals have more to gain by acquiring such qualifications, compared to those of higher ability whose observed or unobserved characteristics can provide them with higher earnings without acquiring such qualifications, so that the additional benefit is lower for higher ability individuals.

8 Marginal Returns to Intermediate Vocational Qualifications Relative to Specific Comparison Group, by Sector and Occupation

The previous sections have examined the returns to intermediate vocational qualifications relative to specific control groups, and highlighted the situations where estimated returns are higher, namely when vocational qualifications are acquired through work, and when acquired by lower ability individuals. However, we have yet to address one source of negative bias in the estimated returns to intermediate vocational qualifications, as discussed in Chapter 2.2 above. This is that individuals who acquire particularly intermediate NVQs are often already working in low-paying occupations. To compare the wages they receive to non-NVQs holders who may be in higher-paying occupations may not be a fair comparison. In other words, observed low wages of NVQ holders may be due to the fact that they were already in a low-paying occupation *before* they acquired the qualification. A more accurate estimate of the wage NVQ-holders would receive if they

did not hold the qualification is therefore the wages of individuals without the qualification but *working in the same occupation or industry.* This solution to reducing any bias was discussed in Chapter 2.4.2 above. This sub-section therefore looks at the returns to intermediate vocational qualification *within* occupations and sectors.

It should be noted, however, that to the extent that qualifications are acquired to in order to gain access to a new sector, or to move up the occupational hierarchy, industry and occupation-specific estimates of the returns to qualification acquisition will not pick up such potential benefits.

Another point to make regarding the results in this section is that, although we discuss, say, an NVQ in one sector or another as if it was the same qualification, in actual fact this will not be the case, and the skills learnt via the same named qualification will actually vary from one sector to another. When we observe estimated returns below that differ from one sector to another for qualifications with the same name, therefore, this may simply be due to fact that the qualifications are actually different. It is beyond the remit of this report to consider this point further by for example examining the skills imparted by qualifications in different sectors.

8.1   NVQs

A number of studies have disaggregated estimated returns by occupation. The key results for NVQ2 that have been observed in the literature are displayed in Table 5 below. More senior occupations such as managers and professionals are not shown, as almost all estimated returns to intermediate qualifications in these occupations were negative, and certainly none are positive and statistically significant. This is because an NVQ2 holder in say a professional occupation will have unobserved characteristics that compare unfavourably with many other individuals in that occupation, leading to a likely strong negative bias in such occupations. Analysis of the 2008 Labour Force Survey shows that 86% of individuals who hold an NVQ2 as their highest qualification work in one of the 1-digit occupations listed in Table 5.

Consider first the results of Jenkins *et al.* (2007), who use LFS data from 1997-2006. With respect to Level 2 qualifications they use their usual two comparison groups, of individuals with no other qualifications at all, and individuals who have no academic qualifications above Level 1 and no vocational qualifications above Level 2 (and thus may have other Level 2 vocational qualifications in addition to their NVQ2). The wages of individuals with NVQ2s are therefore being compared to individuals with no or only low qualifications respectively *who work in the same occupation.*

Table 5: Returns to NVQ2 Qualifications as Highest Qualifications, by Occupation

			Jenkins *et al.* (2007)			Dearden *et al.* (2004)	
Occupation	**Qual.**	**Control group**	**All**	**Male**	**Female**	**Male**	**Female**
Admin	NVQ2	No quals	**1**	-6	**5**	-2	-0
Skilled Occupations	NVQ2	No quals	**13***	**12***	**10**	-2	-3
Personal services	NVQ2	No quals	**9***	-5	**10***	**2**	**5***
Sales	NVQ2	No quals	**4**	**1**	**4**	-21*	**6***
Machine operatives	NVQ2	No quals	**4**	**5**	**3**	**7***	-4
Elementary occ's	NVQ2	No quals	**4**	**5**	**4**	**4**	-1
Admin	NVQ2	L1 and below[4]	-3*	-6*	-3*	-10*	-9
Skilled Occupations	NVQ2	L1 and below	**8***	**8***	**3**	-3	-4
Personal services	NVQ2	L1 and below	**5***	-5	**6***	-6*	**4***
Sales	NVQ2	L1 and below	**3***	-0	**3***	-9*	**1**
Machine operatives	NVQ2	L1 and below	**4***	**4***	**3**	**5***	-1
Elementary occ's	NVQ2	L1 and below	**4***	**4***	**3**	-2	**1**

Notes: 1. The returns reported here are calculated as $e^{\beta} - 1$, where, β is the estimated coefficient in the log-linear wage equation.
2. * statistically significant at the 5% level or better
3. Positive estimates shown in bold, non-positive in gray
4. In Jenkins et al. (2004), this comparison group is vocational Level 2 and below

Jenkins *et al.* (2007) present their full results for the marginal returns to Level 2 qualifications relative to a comparison group of individuals with no qualifications, by occupation in their Table 19 for men and women combined, and for the genders separately in their Tables 20 and 21. These disaggregated results show that positive returns to an NVQ2 are observed in skilled occupations (13%), personal services (9%), and for sales, machine operative and elementary occupations (all 4%). The former two

are statistically significant, whilst the latter three are statistically insignificant[29]. The interpretation of these results is that if an individual working in a skilled occupation, for example, holds an NVQ2 as their highest qualification, he or she will earn 13% more on average relative to an individual with no qualifications who works in the same skilled occupation. This therefore provides an estimate of the gain in wages if entering a skilled manual occupation with no qualifications, and then acquiring an NVQ2. The returns in each sector are quite similar for men and women (as shown in our Table 5 above), with the exception of an absence of returns to NVQ2s in admin, personal services and sales occupations for men.

Jenkins *et al.* (2007) also present results for the marginal returns to NVQ Level 2 qualifications relative to individuals with at best Level 1 academic qualifications or some other Level 2 vocational qualification, by occupation in their Tables 12-14. The same occupations see positive and statistically significant returns to NVQ2s as was the case with the previous comparison group, though as expected, the estimated figures are slightly lower given the better qualified comparison group now being used. Thus the positive and statistically significant returns to NVQ2 are found for skilled occupations (8%), personal services (5%), machine operative and elementary occupations (both 4%) and sales (3%). Disaggregating by gender (as shown in our Table 5 above) reveals the same pattern of results with the new comparison group as before, with men seeing their highest return in skilled manual occupations, while women receive their highest return in personal services.

Other studies have also looked at occupation specific returns to qualifications. The most similar to the estimates presented above are those of Dearden *et al.* (2004), in that they consider qualifications held as individuals' highest qualification, relative to specific comparison groups. They use LFS data from 1996-2002, and focus on NVQ2 qualifications. Relative to a group with no other qualifications, they observe positive and statistically significant returns to an NVQ2 for men in the 'plant and machine operatives' occupational classification (7%), and for women in personal services (5%) and sales (6%, all figures from their Tables 20-23). With the exception of the female sales result, which falls considerably and becomes statistically insignificant, these estimates remain similar

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[29] These statistically insignificant findings could be due to small sample sizes in these disaggregated analyses. A statistically insignificant coefficient has a low t-ratio for the t-test. A low t –ratio can be obtained for one of two reasons: (i) the estimated coefficient itself is very small, so that it would appear that the true, unknown, coefficient may well actually be zero, indicating no effect, or (ii) the estimated coefficient is actually quite large in absolute value, but is estimated with a large standard error, perhaps due to small sample sizes, meaning that our best guess of the true coefficient is the point estimate itself, but we cannot rule out for certain (or with a higher than 95% probability, to be more precise with words) that the true coefficient could actually be zero, due to the imprecision of the estimate. To say the estimated coefficient actually is zero when it is statistically insignificant is not quite correct. It is insignificantly different from zero in a statistical sense, but it is also insignificantly different from many other numbers.

when the comparison group is extended to include individuals with Level 1 qualifications. These estimates are of the same order of magnitude, and in similar occupations, to those obtained by Jenkins *et al.* (2007).

One danger in using the occupation-specific analyses to eliminate, or at least reduce, the negative bias inherent in estimated returns to NVQs, is that a new positive selection bias might be introduced. Compared to the general population, those individuals with NVQ2 qualifications are more likely to have unobserved characteristics that reduce their wage returns, and are more likely to already work in lower-paying industries and occupations, leading to the negative bias discussed in Chapter 2.2 above. However, compared to individuals with low or no qualifications in the same low-paying industries, it could be that those individuals who acquire NVQs in the low-paying industries have better unobserved characteristics. Indeed it could be that the reason they acquired the NVQs but their colleagues did not is because they were selected to receive them by their employers according to characteristics observed to their employers but unobserved by econometricians (hence the term, 'selection bias').

Turning to the estimated returns to NVQ2 by industry, the key results in the literature are shown in our Table 6 below. With respect to industrial sector, Jenkins *et al.* (2007) observe positive returns to an NVQ2 held as the highest qualification, relative to holding no qualification at all in the same sector, of 13% in energy and water, 4% in manufacturing, 9% in construction, 6% in transport and communications, and 8% in public administration, education and health, though only the last estimate is statistically significantly different from zero, due in part to small sample sizes in the disaggregated analysis. When disaggregated further by gender (as shown in our Table 6), this statistically significant effect in public administration, education and health is found to be driven mainly by a stronger result for women. Again, therefore, within some sectors, the benefit of obtaining an NVQ2 for previously unqualified individuals is apparent.

When the comparison group is extended to include individuals with up to Level 2 in other vocational qualifications (i.e. other than NVQ2) and/or up to Level 1 in academic qualifications, the pattern of returns to NVQ2 by industry is largely the same, though more effects are statistically significant due to the larger sample size. Positive and statistically significant returns to NVQ2 are found in construction (9%), public administration, education and health (3%) and other services (7%). Disaggregating by gender shows the construction result is driven by a strong result for males, whilst the latter two effects are the result of strong returns in those sectors for females. It would appear that there are significant differences in the returns to NVQ2 by sector along traditional gender lines.

Table 6: Returns to NVQ2 Qualifications as Highest Qualifications, by Industry

			Jenkins *et al.* (2007)			Dearden *et al.* (2004)	
Industry	**Qual.**	**Control group**	**All**	**Male**	**Female**	**Male**	**Female**
Energy and water	NVQ2	No quals	**13**	**14**	-8	**7**	0
Manufacturing	NVQ2	No quals	**4**	**1**	**6**	**2**	**2**
Construction	NVQ2	No quals	**9**	**9**	-5	-1	**18**
Distrib./hotels etc	NVQ2	No quals	-1	-5	**1**	-3	**3**
Transport and comm.	NVQ2	No quals	**6**	**9**	**1**	**4**	-11
Finance	NVQ2	No quals	-5	-14	**2**	-7	**9**
Public/educ/health	NVQ2	No quals	**8***	**4**	**8***	**6**	**8***
Other services	NVQ2	No quals	-1	-1	-3	-6	**6**
Energy and water	NVQ2	L1 and below[4]	**6**	**2**	**13**	**13***	-13
Manufacturing	NVQ2	L1 and below	**1**	-1	**3**	-2	-0
Construction	NVQ2	L1 and below	**9***	**11***	-2	-4	-3
Distrib./hotels etc	NVQ2	L1 and below	**2**	0	**2***	-5*	**1**
Transport and comm.	NVQ2	L1 and below	-1	-4	**1**	-4	-7
Finance	NVQ2	L1 and below	-3	-11*	0	-15*	-7*
Public/educ/health	NVQ2	L1 and below	**3***	-7*	**4***	-9*	**3***
Other services	NVQ2	L1 and below	**7***	**5**	**8***	-7	**7***

Notes: 1. The returns reported here are calculated as $e^{\beta} - 1$, where, β is the estimated coefficient in the log-linear wage equation.
2. * statistically significant at the 5% level or better
3. Positive estimates shown in bold, non-positive in gray
4. In Jenkins et al. (2004), this comparison group is vocational Level 2 and below

Dearden *et al.* (2004) obtain similar results in their analysis by sector. For example, they agree with Jenkins *et al.* (2007) that public administration, education and health apparently value NVQ2s, particularly amongst women, who earn a positive and statistically significant return of up to 8% when compared to individuals with no qualifications (their Table 18). NVQ2 also earns a return of around 6% for women in 'other services'. For males (their Table 16), NVQ2 does not earn a positive and statistically significant coefficient in any sector, with positive though statistically insignificant returns observed in public administration, education and health (6%) and transport and communications (4%).

Summary

The analysis of returns to intermediate vocational qualifications by occupation and sector serves two purposes. First, it shows that estimated returns are not homogenous across occupations and sectors, and that NVQs obtained in some sectors have a higher economic value than those obtained in other sectors. If it can be understood why, then the good aspects of the successful qualifications could be transplanted to the lower valued qualifications.

Second, Chapter 2.2 identified a source of bias in the estimated returns to NVQs, in that they are more likely to be acquired by individuals already working in low-paying occupations. By comparing NVQ holders to individuals without such qualifications but working in the same occupation or sector, that part of the overall negative bias is removed. The results show that there are clearly occupations and economic sectors where NVQ2 qualifications do deliver economic value, raising the wages of individuals with previously no or low qualifications in those areas. Thus men working in mainly manual occupations such as 'skilled manual' and 'machine operatives' or working in sectors such as construction, will receive economic benefit if they raise their attainment level through an NVQ2 and so obtain an NVQ2 as their highest qualification. Women working in personal services or sales occupations, or working in the service sector or particularly in public administration, education and health will similarly benefit.

How close do these estimates come to what we want to estimate, namely the pure, independent impact of intermediate vocational qualifications on earnings? They probably come as close as any in the available literature to answering the question of the value of obtaining an intermediate vocational qualification at a new highest level. They have attempted to control for unobserved differences in characteristics between those with and without the intermediate vocational qualification, by restricting the comparison group without the vocational qualification to be either unqualified or low-qualified. In addition,

they have controlled for the fact that individuals who train for an NVQ2 are likely to work in very different (possibly lower-paying) occupations and industries to those who do not undertake such training. Therefore, they will be most successful in the low and mid-ranked occupations where individuals who acquire NVQs are found. In higher ranked occupations, NVQs are less common, and the control group of individuals in the same occupation but without NVQs are less likely to share similar characteristics, and so negative biases remain.

The extent to which any bias remains in the estimates presented in this section depends on how accurately the wages of the various comparison groups proxy the wages of those who acquire qualification, if they had not acquired those qualifications. The comparison groups chosen probably represent the best match available, at least in the low and mid-ranking occupations where NVQs are typically obtained.

8.2   Other Intermediate Vocational Qualifications

Jenkins *et al.* (2007) also consider the returns to other intermediate vocational qualifications by occupation and industry, though the estimates in these disaggregated analyses are somewhat erratic, since fewer individuals hold such qualifications compared to NVQ2, and some of the estimated returns are unrealistically large. Their results are reported in our Tables 7 and 8 below.

When the comparison group is individuals with no qualifications at all, BTEC First/General Diplomas are most valued in administrative/secretarial, skilled manual and personal service occupations. RSA Diplomas receive their highest returns in administrative/secretarial, skilled manual and elementary occupations, and City and Guilds Craft/Part 2 qualifications receive their highest return, somewhat surprisingly in sales occupations. With respect to industrial sector, BTEC First/General Diplomas earn their highest return in the finance and 'other services' industries, RSA Diplomas in public administration, education and health, and City and Guilds Craft/part 2 in distribution, hotels and restaurants and in other service industries.

When the comparison group is extended to consider those individuals with vocational qualifications up to Level 2 and academic qualifications up to Level 1, many of the sectoral returns are more sensible, and more are statistically significant, due to the larger sample size available. Skilled manual occupations see positive and statistically significant returns to BTEC First/General Diploma (13%), City and Guilds Craft/part 2 (8%) and RSA Diploma (52%). Personal services give positive and statistically significant returns to BTEC First/General Diploma (15%) and City and Guilds Craft/Part 2 (9%). The

same two qualifications are also the ones to receive positive and statistically significant returns for sales occupations (BTEC First/General Diploma at 10% and City and Guilds Craft/Part 2 at 8%) and for machine operatives (BTEC First/General Diploma at 24% and City and Guilds Craft/Part 2 at 8%). With respect to industrial sector, all one digit industries receive positive and statistically significant returns to at least one Level 2 qualification relative to the low qualified comparison group, with the exception of agriculture and energy.

Table 7: Returns to Other Level 2 Vocational Qualifications as Highest Qualifications, by Occupation

Occupation	Qual.	Control group	All	Male	Female
Admin	BTEC 2	No quals	**40***	**-**	**41***
Skilled Occupations	BTEC 2	No quals	**25**	-10	**107***
Personal services	BTEC 2	No quals	**24***	**43***	**-**
Sales	BTEC 2	No quals	-7	**5**	-1
Machine operatives	BTEC 2	No quals	-20*	-21*	**-**
Elementary occ's	BTEC 2	No quals	-11	-22*	-3
Admin	C&G 2	No quals	**4**	**18***	-1
Skilled Occupations	C&G 2	No quals	**2**	**1**	**5**
Personal services	C&G 2	No quals	**5**	-0	**9**
Sales	C&G 2	No quals	**19**	**28**	**15**
Machine operatives	C&G 2	No quals	**8***	**7**	**11**
Elementary occ's	C&G 2	No quals	**4**	**2**	**4**
Admin	RSA 2	No quals	**10**	**47***	**8**
Skilled Occupations	RSA 2	No quals	**119***	**114***	**-**
Personal services	RSA 2	No quals	-1	**-**	-3
Sales	RSA 2	No quals	-2	**70***	-7

Machine operatives	RSA 2	No quals	8	23*	3
Elementary occ's	RSA 2	No quals	68*	-	64*
Admin	BTEC 2	Voc L2 and below	5	–4	6*
Skilled Occupations	BTEC 2	Voc L2 and below	13*	12	48
Personal services	BTEC 2	Voc L2 and below	15*	23	13*
Sales	BTEC 2	Voc L2 and below	10*	10	11*
Machine operatives	BTEC 2	Voc L2 and below	24*	26*	14
Elementary occ's	BTEC 2	Voc L2 and below	–0	6	–7
Admin	C&G 2	Voc L2 and below	1	5	–1
Skilled Occupations	C&G 2	Voc L2 and below	8*	8*	2
Personal services	C&G 2	Voc L2 and below	9*	4	9*
Sales	C&G 2	Voc L2 and below	8*	2	8*
Machine operatives	C&G 2	Voc L2 and below	8*	7*	7
Elementary occ's	C&G 2	Voc L2 and below	2	–0	4
Admin	RSA 2	Voc L2 and below	9*	–8	10*
Skilled Occupations	RSA 2	Voc L2 and below	52	54*	-
Personal services	RSA 2	Voc L2 and below	0	–25*	1
Sales	RSA 2	Voc L2 and below	7	53*	5
Machine operatives	RSA 2	Voc L2 and below	–1	–6	8
Elementary occ's	RSA 2	Voc L2 and below	7	–25*	14

Notes: 1. The returns reported here are calculated as $e^{\beta} - 1$, where, β is the estimated coefficient in the log-linear wage equation.
2. * statistically significant at the 5% level or better
3. '-' indicates that the figure is not provided in the original paper.
4. Positive estimates shown in bold, non-positive in gray.

Table 8: Returns to Other Level 2 Vocational Qualifications as Highest Qualifications, by Industry

Industry	Qual.	Control group	All	Male	Female
Energy and water	BTEC 2	No quals	0	-	-
Manufacturing	BTEC 2	No quals	-1	-26*	**85***
Construction	BTEC 2	No quals	0	-	-
Distrib./hotels etc	BTEC 2	No quals	**14**	**2**	**31**
Transport and comm.	BTEC 2	No quals	0	-	-
Finance	BTEC 2	No quals	**30***	-	**32***
Public/educ/health	BTEC 2	No quals	-5	-	-5
Other services	BTEC 2	No quals	**53***	**66***	-
Energy and water	C&G 2	No quals	-10	-12	-
Manufacturing	C&G 2	No quals	**9***	**7**	**14**
Construction	C&G 2	No quals	**13**	**13**	-
Distrib./hotels etc	C&G 2	No quals	**10***	**3**	**17***
Transport and comm.	C&G 2	No quals	**7**	**10**	-3
Finance	C&G 2	No quals	-5	-11	**9**
Public/educ/health	C&G 2	No quals	-0	-2	**5**
Other services	C&G 2	No quals	**11***	**17***	**20**
Energy and water	RSA 2	No quals	**1**	-	-
Manufacturing	RSA 2	No quals	**30***	**68***	**5**
Construction	RSA 2	No quals	**25***	-	**30***
Distrib./hotels etc	RSA 2	No quals	-9	-	-8
Transport and comm.	RSA 2	No quals	**14**	**27***	**21**
Finance	RSA 2	No quals	**17**	**60***	**10**
Public/educ/health	RSA 2	No quals	**32***	-	**32***
Other services	RSA 2	No quals	-8	-	-9*

Industry	Qual.	Control group	All	Male	Female
Energy and water	BTEC 2	Voc L2 and below	-15	-29	**11**
Manufacturing	BTEC 2	Voc L2 and below	**10***	**9**	**10***
Construction	BTEC 2	Voc L2 and below	**19**	**19**	**16**
Distrib./hotels etc	BTEC 2	Voc L2 and below	**10***	**15***	**6**
Transport and comm.	BTEC 2	Voc L2 and below	**13**	**10**	**18**
Finance	BTEC 2	Voc L2 and below	**11***	**7**	**12***
Public/educ/health	BTEC 2	Voc L2 and below	**14***	**25***	**12***
Other services	BTEC 2	Voc L2 and below	**17***	**14**	**23***
Energy and water	C&G 2	Voc L2 and below	**14***	**13**	**30**
Manufacturing	C&G 2	Voc L2 and below	**7***	**4***	**14***
Construction	C&G 2	Voc L2 and below	**14***	**15***	-19*
Distrib./hotels etc	C&G 2	Voc L2 and below	**5***	**2**	**5***
Transport and comm.	C&G 2	Voc L2 and below	**7***	**6**	**6**
Finance	C&G 2	Voc L2 and below	**1**	-3	**8**
Public/educ/health	C&G 2	Voc L2 and below	**7***	**3**	**10***
Other services	C&G 2	Voc L2 and below	**9***	**12***	**3**
Energy and water	RSA 2	Voc L2 and below	**5**	-	-7
Manufacturing	RSA 2	Voc L2 and below	**14***	**16**	**14***
Construction	RSA 2	Voc L2 and below	**22**	**44**	**11**
Distrib./hotels etc	RSA 2	Voc L2 and below	**12***	**6**	**14***
Transport and comm.	RSA 2	Voc L2 and below	**2**	-14	**13**
Finance	RSA 2	Voc L2 and below	**18***	**62**	**16***
Public/educ/health	RSA 2	Voc L2 and below	**16***	-15	**16***
Other services	RSA 2	Voc L2 and below	**13**	-	**12**

Notes: *1. The returns reported here are calculated as $e^{\beta} - 1$, where, β is the estimated coefficient in the log-linear wage equation.*

       2. * statistically significant at the 5% level or better

       3. '-' indicates that the figure is not provided in the original paper.

       4. Positive estimates shown in bold, non-positive in gray.

Before leaving this section, it should be mentioned that Jenkins *et al.* (2007) also look at Level 3 vocational qualifications by occupation and industry, when held as the individuals' highest qualification, relative to a comparison group with at best Level 2 academic qualifications and at best Level 3 vocational qualifications other than the one being considered in each case.[30] Thus the wages of individuals who achieve at best Level 3 vocational qualifications are being compared to the wages of a group of individuals, some of whom will have achieved good GCSEs and reached academic Level 2, though none of whom have achieved higher than this in terms of academic qualifications. The estimated returns in such circumstances are large, positive and statistically significant in most cases for each qualification. The returns are particularly large in middle-ranking occupations such as skilled manual (24-36% across different qualifications), personal services (12-17%), sales (9-25%) and machine operatives (6-18%) (their Table 34), as well as being strong in most industrial sectors.

A slightly different approach to estimating returns by specific sector is undertaken by Dickerson and Vignoles (2007), who consider Sector Skills Councils as the sectoral unit of analysis. Their analysis also differs from the others reviewed in this section, as they consider qualifications grouped together by level and type (e.g. Vocational Level 2) rather than specific qualifications. Their results are also average returns across all individuals with the qualifications of interest, against a control group of all individuals without (rather than considering only those holding the qualifications of interest as their highest qualification, relative to specific control groups). We would therefore expect negative biases caused by unobserved characteristics of individuals with intermediate vocational qualifications to be present, and so Dickerson and Vignoles' results to be less positive than those reviewed above. This turns out to be the case, with the authors reporting that vocational Level 2 qualifications only achieve a positive and statistically significant return in 2 sectors for males, namely Energy and Utility Skills (electricity, gas, waste management and water industries) and People 1st (hospitality, leisure, travel and tourism), and in 1 sector for females, Automotive Skills (retail motor industry) (results from their Statistical Annex, Tables A7M/F). What these results do highlight is that, with a different measure of sectors, there is still significant variation in the estimated returns to intermediate vocational qualifications across sectors, with a range of positive and negative estimates, suggesting such qualifications are more successful in some settings than in others. The fact that so few estimates are positive and statistically significant in their 'average returns' specification also shows the importance of only considering those who obtain the intermediate vocational qualification as their highest qualification and the

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[30] Clearly, the authors thought that the group with no qualifications at all would not form an appropriate comparison group for individuals with Level 3 qualifications, an assumption that sounds appropriate.

use of specific, low-qualified control groups, for obtaining the wider range of positive estimated returns obtained by the other papers reviewed in this section.

Summary

Individuals who acquire one of the 'other' intermediate vocational qualifications as their new highest qualification earn a significant wage premium compared to individuals in the same occupation or industry who remain with low level or no qualifications. These wage gains are higher than the equivalent ones obtained by individuals who acquire an NVQ2.

9. Returns to Intermediate Vocational Qualifications Obtained as an Adult: Longitudinal Analysis

Recall from Chapter 4.2 that a useful method used to control for unobserved differences between individuals with and without qualifications was estimating the wage equation in first differences. In such a specification, any unobserved characteristics such as ability and motivation would drop out, as long as they remain constant over time. So far in the discussion of results available in the literature, differences between those with and without qualifications have been controlled for as far as possible by deliberately choosing particular control groups, using cross-sectional data. This section discusses the few papers in the literature that use longitudinal (or panel) data, where first-differencing is possible.

The papers reviewed in this section therefore use data on the same individuals at multiple points in time, and examine the effects on wages of acquisition of qualifications between two such data points after the respondents had left formal education. Note that all of the results in this section consider *any* qualification attainment as an adult, rather than focussing on qualifications attained as the individuals' new highest qualifications. The results being considered are therefore fundamentally different to all of the other results in Part B of this review.

Two recent papers have focussed on such qualification attainment by adults. Both use the birth cohort data sets, since the acquisition of a qualification between one sweep of data collection and another can easily be observed. Jenkins *et al*. (2002) use NCDS data to study qualification acquisition between 1991 and 2000, that is between the ages of 33 and 42 for the NCDS cohort who were born in 1958. Variables are used that measure the type and level of the qualification acquired between these points in time (e.g. Academic Level 1, Vocationally-Related Level 2, Occupational Level 3 etc). They therefore do not identify specific individual qualifications, though as they point out many

of these qualification categories are dominated by a particular qualification. The omitted category is individuals with no qualification attainment between these ages. The estimated wage equation also includes measures of highest qualification attainment by 1991. This controls for the fact that the higher qualified are more likely to engage in further learning, so that the higher wages associated with adult qualification acquisition could have been due to the fact that they were better qualified in the first place, if the latter is not controlled for. Since it is NCDS data being used, there are also a large number of other control variables used, including ability and family background. The estimated coefficients therefore measure the average difference between the wages at age 42 of an individual who acquires a particular qualification type between the ages of 33 and 42, and the wages of an individual who does not acquire any qualifications during the same period, holding constant initial education level and the range of other included characteristics.

The results are displayed by Jenkins *et al*. (2002) in their Table 9 (all workers), Table 10 (males) and Table 11 (females).   They reveal that very few qualifications, when obtained between the ages of 33 and 42, are associated with higher wages for this cohort of individuals at age 42. Of the intermediate (Levels 2 and 3) vocational and occupational qualification categories, the authors obtain negative and statistically significant coefficients on the Level 2 qualifications. When split by gender, all Level 2 coefficients remain negative, though only the occupational qualification coefficients are statistically significant. The literal implication is that such qualification acquisition by adults actually reduces one's wages. This literal implication seems implausible, however, and the more likely explanation is the statistical explanation, that those individuals who choose to acquire Level 2 vocational qualifications as an adult have unobserved characteristics associated with lower wages, and it is those unobserved characteristics, rather than the qualification acquisition, that is actually driving the negative return. In addition, these estimates do not control for any differences in jobs done between individuals who do and do not acquire such qualifications as adults.

At Level 3, the estimated returns to adult qualification acquisition are universally positive in all specifications across the qualification types and genders, though none are statistically significant and most are small in size, the largest being just 6%.

These estimates do not answer our question as to the value of vocational qualifications, as posed in the Introduction above, as successfully as the estimates discussed in the previous sections did when using specific comparison groups, and when looking within occupations and industries. Furthermore, the 'adult learning' specifications discussed in this section so far differ from the specifications in the previous sections in Part B of this

review, in that the qualification acquisition is not constrained to be at the individuals' new highest level. Thus, some of the adult attainment behind the results in the preceding paragraphs could be individuals already qualified to a high level, going back to acquire lower level qualifications, possibly for a career change. Although Jenkins *et al*. (2002) do not explicitly estimate a 'highest qualification' specification, they do run the wage equations just discussed separately by prior level of attainment (i.e. respondents' highest qualification in 1991). Unfortunately, in these estimated equations, they do not separate qualifications acquired after 1991 by level, as was done previously in the aggregate specification, because of small cell sizes. The results do show, however, that even for the group with no prior qualifications in 1991, the only type of adult learning to be associated with higher earnings in 2000 is academic qualification attainment, with the coefficient on both the vocational and the occupational adult learning variables being statistically insignificant (their Table 14). Estimated returns derived through propensity score matching also fail to reveal particularly large or statistically significant returns to adult learning even for the group with no prior qualifications (their Table 18).

All of the results from Jenkins *et al.* (2002) just discussed above look at the impact of adult qualification attainment on the *level* of wages at age 42 (in the year 2000). However, given that the authors have data on the same individuals at different points in time, they can also estimate first-differenced equations, looking at the *change* in wages between the ages of 33 and 42 when a qualification is acquired in this period. As described in Chapter 4.2 above, first-differenced equations are useful in that they control for (or more accurately, net out) unobserved characteristics of individuals that remain constant over time, such as unobserved motivation or ability. When Jenkins *et al*. (2002) estimate first-differenced specifications (their Table 13), however, in no case is the acquisition of an intermediate level (Level 2 or 3) vocational or occupational qualification between the ages of 33 and 42 associated with a statistically significant positive *increase* in wages between these ages.

De Coulon and Vignoles (2008) perform a similar analysis of adult learning, this time using BCS data from 1996, 2000 and 2004, thus looking at qualification attainment between the ages of 26 and 34 for this cohort of individuals born in 1970. The focus of their report is explicitly on NVQ2, and other than this particular qualification, all other qualifications acquired are simply denoted by the level of attainment. Other than this, the specification of the wage equation is very similar to that used in Jenkins *et al*. (2002), with controls included for highest qualification in 1996, ability, family background, and other personal characteristics. The results (their Table 7) report negative effects of acquiring an NVQ2 between the age of 26 and 34 on the *level* of wages at age 34 in every specification they estimate, the effect being statistically significant for females in the case

of 2004 wages. These negative effects on the level of wages are the same as were found by Jenkins *et al*. (2002), and have the same likely explanation, that they are the result of negative bias caused by the unobserved characteristics of the individuals who acquire NVQ2 qualifications as an adult.

De Coulon and Vignoles (2008) then estimate first differenced equations, in an attempt to control for unobserved characteristics of NVQ2-attainers that may be lowering their wages. The key results (from their Table 9b) are shown in our Table 9 below, and reveal that the acquisition of an NVQ2 between the ages of 26 and 34 is associated with a 22% growth in wages between these ages (around 25% for females and 17% for males).

Table 9: Percentage Change in Wages When Qualification Acquired Between Ages 26 and 34

Qualification	All	Male	Female
NVQ2	22*	17	25*
Other Level 2	36*	41*	26*
Level 3	19*	13	25*

Notes: 1. The returns reported here are calculated as $e^{\beta} - 1$, where, β is the estimated coefficient in the log-linear wage equation.
2. * statistically significant at the 5% level or better
3 Qualifications in rows 2 and 3 (qualifications other than NVQ2) are for academic and vocational qualifications combined.

These effects are clearly very large, and are statistically significant with the exception of the male effects for NVQ2 and Level 3[31]. The result indicating the beneficial effects of NVQ2 is particularly encouraging. It should be noted, however, that it is a single estimate, for a single cohort of individuals at a particular point (that was not observed for the NCDS cohort at a different point in time by Jenkins *et al*., 2002, so there is no replication of common results in the literature in this area), and is based on small sample sizes. Its importance therefore should not be overemphasised. In addition, the eight year period over which the first-differenced wages are calculated may affect the results. The longer the time period, the harder it is to attribute the change in wages to the qualification acquisition. Essentially we are observing a growth in earnings over the eight year period that is higher for people who acquired a qualification at some point during this period than for people who did not, though this might have been caused by other unobserved factors

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[31] These statistically insignificant male effects are another occasion where the statistical insignificance should not be translated into saying the effect is zero. The point estimate of the wage return is large and positive, but is not significantly different from zero (or for that matter from a wide range of other numbers including the estimated female returns) because of the high standard error caused by low cell sizes.

that have changed during this period and are correlated with qualification acquisition. In the case of NVQ2s acquired between 1996 and 2004, a prime candidate for another factor that might have changed to affect earnings is the introduction of the National Minimum Wage in 1999. For those earning less than the first minimum wage of £3.60, the average pay increase needed to bring them up to the level of the National Minimum Wage was 15.5% (Metcalf, 2008). Since we know from above that individuals who acquire NVQ2s are amongst the least well paid, those who have acquired an NVQ2 are quite likely to have been disproportionally affected by the introduction of the National Minimum Wage, which could explain why they have seen some of the largest increase in wages during this period.

However, further work of this type must clearly be undertaken, and if this result can be replicated and generalised with other data sources, it would suggest that NVQ2 qualifications have more economic value in the labour market than previously thought.

The first differenced, longitudinal estimates are therefore a different way to try to answer our question posed in the Introduction, compared to the studies discussed in the previous sections. The studies in the previous sections attempted to control for differences between the treatment and control groups of acquirers and non-acquirers respectively, and considered any difference in wages to be the expected gain in wages from acquiring the qualification. The lifelong learning estimates are attempting to more accurately estimate the gain in wages following acquisition of a qualification, by considering the same people over time. The results obtained so far are not robust across studies and are influenced by small samples and long time differences, but they do at least suggest that further research in this area would be very useful, possibly with panel data sets created from administrative data.

Summary

Longitudinal or panel data allow researchers to examine the impact of qualification acquisition by individuals on the change in their wages between two points in time. Under the assumption that unobserved characteristics of individuals such as ability and motivation do not change over time, their change over time will therefore be zero, and so they drop out of a first-differenced, wage change equation. Such a specification would therefore not be subject to bias caused by such unobserved characteristics.

To put it another way, longitudinal analysis of wage changes compares the wages of an individual after they have acquired a qualification to the wages of the same individual before the acquisition. Thus their wage at the earlier point in time now provides the estimate of their wage if they had not acquired the qualification, rather than relying on the

wages of other individuals without the qualification, who might have very different unobserved characteristics, to provide an estimate of the counterfactual.

There are however problems with such an approach. Although individual characteristics such as ability and motivation may stay constant over time, as required by the analysis, other factors that affect wages could be changing over time. The longer the time period between wage observations, the greater the chance of other factors coming into play. If such factors are also correlated with qualification acquisition, then the variable indicating individuals who have acquired a qualification could actually be picking up the impact of these other factors. For example, if those who acquire an NVQ2 are mostly low paid on average, then they will have been disproportionally affected by the introduction of the National Minimum Wage, and any positive wage change spanning the introduction of the National Minimum Wage could be reflecting the influence of the new minimum wage, rather than the impact of the qualification itself. Another problem with this methodology is that there will be much fewer instances of qualification acquisition between two points in time in a longitudinal data set, than instances of individuals who have ever acquired that qualification in cross-sectional data sets. Estimates of the returns to qualifications based on qualification acquisition and wage changes between two points in time will therefore be based on much smaller numbers of cases than cross-sectional evidence.

Bearing these advantages and disadvantages of longitudinal evidence in mind, the most recent such study (De Coulon and Vignoles, 2008) of individuals in the British Cohort Study of people born in a particular week in 1970 suggests that individuals who acquired an NVQ2 qualification between the ages of 26 and 34 saw their wages change over the same period by 22% more than individuals who did not acquire such a qualification. Other intermediate qualification acquisition at Level 2 and Level 3 also saw large wage changes, while the wage increases associated with Level 4 and 5 qualification acquisition was much smaller. Note however, that an earlier study (Jenkins *et al*, 2002) of an earlier cohort of individuals (the National Child Development Study of individuals born in a particular week in 1958) did not replicate these results, and could find no evidence of positive wage changes following the acquisition of intermediate vocational qualification.

Note that the positive longitudinal evidence of DeCoulon and Vignoles (2008) is not inconsistent with cross-sectional evidence showing smaller or even zero returns. One individual can receive a larger change in wages between two points in time than another individual, but still receive less than that individual in absolute terms at the end of the period, if he started at a much lower level.

10.   Apprenticeships

So far in this review, no attention has been given to apprenticeships, which is perhaps surprising given that the focus has been on intermediate vocational learning. The reason why apprenticeships are being discussed in their own section is that an apprenticeship may be more appropriately thought of as a process, rather than a qualification in itself[32]. In addition, and for this reason, apprenticeships are often treated differently to other qualifications in the data sets used by researchers in this area. For example, in the LFS, apprenticeships are not included in the list of qualifications from which respondents can identify which ones they hold, but are asked about in a separate question of their own on the questionnaire.

Some of the papers reviewed above do include indicators of having completed an apprenticeship in their wage equations, for example, Jenkins *et al.* (2007). They estimate the marginal returns to a Level 3 apprenticeship (i.e. the returns when such an apprenticeship is the individuals' highest qualification), estimated on a full sample of working age individuals (i.e. the sample contains all working individuals, rather than restricting the sample to individuals with a particular low level of qualifications), to be 8% and statistically significant (7.5% and statistically significant for males but zero for females). An apprenticeship at the foundation level (i.e. Level 2) earns a statistically significant marginal return of 10% (25% for males but negative and statistically insignificant for females, all figures from their Table 3).

Jenkins *et al.* (2007) also estimate the marginal returns to apprenticeships relative to their specific comparator groups, rather than to the full sample. Relative to a group with at best Level 3 vocational qualifications and Level 2 academic qualifications, individuals with a (Level 3) apprenticeship as their highest qualification earn a statistically significant marginal return of 12% (13% and statistically significant for males, but 1% and statistically insignificant for females, from their Table 33). Relative to a group with at best Level 2 vocational qualifications and Level 1 academic qualifications, individuals with a (Level 2) foundation apprenticeship as their highest qualification earn a statistically insignificant marginal return of 5% (25% and statistically significant for males, but negative and statistically significant for females, from their Table 11). Finally, relative to a group with no other qualifications, individuals with a (Level 2) foundation apprenticeship as their

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[32] Apprenticeships are a form of workplace training designed to bring individuals up to competence in an occupation. Since 1994, publicly funded apprenticeships in the UK have been linked to a framework of qualifications where the main aim is the achievement of a S/NVQ, although many apprenticeships also include a knowledge-based qualification such as a BTEC and a City and Guilds in addition to qualifications designed to support employability skills. In Scotland and Wales publicly funded apprenticeships are currently known as Modern Apprenticeships.

highest qualification earn a statistically significant marginal return of 45% (46% and statistically significant for males, but no estimate is possible for females due to insufficient observations, from their Table 18). The last figures are unrealistically large, presumably caused by the small sample size in this specification.

More detail on the returns to apprenticeships is provided by McIntosh (2005, 2006). The 2005 report uses LFS data from 1996-2002. The main specification looks at average returns to an apprenticeship across all individuals who have completed one. The results show returns of around 7% for males (statistically significant), but zero for females (his Tables 1 and 2). Further analysis shows that for males at least, there are higher returns to be obtained when the individuals hold a vocational qualification as well as complete an apprenticeship, though the data do not allow the author to specify whether the qualification was actually obtained as part of the apprenticeship. Thus, for males, an apprenticeship with no vocational qualifications receives a 7% return, but an apprenticeship obtained as well as an NVQ at Level 3 or above receives a 14% return (his Table 3). The paper also estimates the returns to apprenticeship by highest level of school qualification achieved. Such results are different to the marginal results discussed above in earlier sections, in that the apprenticeship is not necessarily the individuals' highest qualification. Nevertheless, the results are still instructive as far as indicating to where resources should be targeted. The results show that for males[33], apprenticeships provide higher returns the lower the level of school attainment. Thus the returns to apprenticeship are estimated to be 13%, 9%, 8% and 4%, for males with no school qualifications, no grade A*-C GCSEs, 1-4 grade A*-C GCSEs and 5+ grade A*-C GCSEs respectively (his Table 5). The combination of NVQ3s with apprenticeships are however higher for the better qualified school leavers. Thus, individuals who leave school with some qualifications require their apprenticeships to provide further qualification, in order to obtain a better return.

McIntosh (2006) provides more detail on the returns to apprenticeship, and in particular estimates a full cost-benefit analysis to completing an apprenticeship. None of the other papers reviewed in this report have attempted to do this, due to a lack of information on the costs of acquiring the various qualifications considered. However, McIntosh could compare the returns to an apprenticeship to the costs of undertaking one, given he had estimates of these costs. The report also differs from all others reviewed above in that it estimates social returns and costs, rather than private returns and costs to the individuals themselves. The focus is mostly on what at the time of the report were called Modern Apprenticeships. These were created in 1994 when apprenticeships were re-introduced

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[33] Female equations were not estimated, due the absence of any female wage effects of apprenticeships in the earlier specifications.

into UK training policy. Since 2004, they have simply been called apprenticeships again, however. The key point to note is that McIntosh was considering the costs of and returns to apprenticeships that had been quite recently completed by almost exclusively younger age workers. The data used in the report are from the LFS of 2004 and 2005.

The estimated wage returns are marginal returns, in that they are the returns to apprenticeships when they are the highest 'qualification' held. In addition, a specific comparator group is used, comprising individuals whose highest qualification is at Level 2 (either academic or vocational qualifications). Note that this was specifically 'Level 2'and not 'Level 2 or below', as was the type of comparator group in some of the papers reviewed above. A place on a Level 3 apprenticeship is difficult to obtain, and it is only those with good GCSEs or similar who could expect to be accepted. A comparison group of individuals with no qualifications at all would therefore have been inappropriate. Where McIntosh (2006) explicitly considers a Foundation (Level 2) apprenticeship, the comparator group is chosen to be those individuals whose highest qualification is either at Level 1 or at Level 2 (again, either academic or vocational qualifications.

The results show substantial marginal returns to apprenticeships, relative to the comparator groups just discussed. An Advanced (Level 3) Modern Apprenticeship yields a 22% return for males a 14% return for females (both statistically significant). A Foundation (Level 2) Modern Apprenticeship yields a 20% return for males (statistically significant) though a statistically insignificant 4% return for females (all figures from his Table 1). These estimated wage returns are then combined with the estimated increased likelihood of employment for those with a completed apprenticeship, and then compared to the costs of undertaking an apprenticeship, in terms of costs to the government, costs to the employers providing the apprenticeships, and costs to individuals in terms of foregone earnings. Once the value of all future benefits are discounted, the end result is a net present value (NPV) for the investment in apprenticeship. These turn out to be substantial, with values of £105,190 for an Advanced (Level 3) Modern Apprenticeship, and £73,001 for a Foundation (Level 2) Modern Apprenticeship. Such numbers are significantly larger than the NPV estimated by McIntosh (2006) for other vocational qualifications, which are £33,894 for NVQ3 and £29,781 for other Level 3 vocational qualifications, and £13,012 for NVQ2 and £8,049 for other Level 2 vocational qualifications (all numbers from his Table 8).[34] Note however, that the returns to other intermediate vocational qualifications are averaged across all provider routes. If apprenticeships were compared to other intermediate vocational qualifications when the

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[34] The higher NPV for NVQs rather than other vocational qualifications might be viewed with surprise given the relative estimated returns to these qualifications discussed above. However, the costs of providing NVQ are also lower than for other vocational qualifications, particularly at Level 3, thus producing a higher NPV for NVQs.

latter are also only provided through employers (where the returns are higher as seen in Chapter 6 above) then these difference would be smaller.

Finally, McIntosh (2006) calculates the NPV of apprenticeships (at any level) in five different sectors of the economy. The NPV is shown to be higher in sectors such as Construction (£156,523) and Engineering (£78,351) compared to the service sectors considered, with the lowest estimated NPV in the Retail sector (£31,928, all numbers from his Table 9).

Summary

Apprenticeships seem to be a valued way to provide vocational learning. Evidence has consistently shown that apprenticeships yield healthy positive and statistically significant returns, at least for males. The most recent evidence, however, based on 2004/5 Labour Force Survey data and only considering recently completed apprenticeships (Modern Apprenticeships) suggests positive returns for females as well as males at Level 3. Cost-benefit analysis of apprenticeships suggest that these wage return benefits comfortably outweigh the costs to all parties concerned, leading to very good net present values and rates of return. Since NVQs are an integral part of apprenticeships, these results suggest an effective means of delivering NVQs.

Part C: Other Estimated Returns to Intermediate Vocational Qualifications

The various sections above, comprising Part B of this review, have all considered returns to vocational qualifications when held as individuals' highest qualification relative to specific comparison groups, in various circumstances[35]. As was argued in Chapter 2.4, this is the methodology that will come closest to answering the question posed in the Introduction, namely the economic value to a particular individual of acquiring an intermediate vocational qualification, in the sense that the various biases will be smallest. These are not the only estimates of returns to vocational qualifications provided in the literature, however, and so this part of the report reviews the other estimates that have been produced. The aim of this part of the review is therefore to ensure that a comprehensive coverage of the available evidence is achieved, and also to show how the estimated returns change when attempts are not made to control for the negative biases.

11.   Marginal Returns to Intermediate Vocational Qualifications, Full Sample Results

This section contains estimates of the marginal returns to qualifications (i.e. the returns when held as highest qualification), for the full sample available to the various authors. The control group is therefore all people who have not reached the *vocational* level of interest, and so could include highly qualified individuals via the *academic* route. There is therefore no attempt made to control for unobserved differences between vocational qualification holders and non-holders by using a particular comparison group, nor any attempt to control for the different jobs done by these two groups. Such analyses are therefore moving further away from providing an answer to the specific question posed in the Introduction, of how much benefit a particular individual would receive following the acquisition of an intermediate vocational qualification, relative to their position prior to the acquisition. This is because, the less we target the control group, the less it will provide an accurate estimate of the individual's wages if they had not acquired the intermediate vocational qualification. The estimates presented in this section do, however, reveal the impact of some of the biases discussed in Chapter 2.2 above, when they are compared to the various results in Part B above that try to correct for these biases.

The most detailed, as well as most up-to-date, analysis of marginal returns is presented by Jenkins *et al.* (2007). The wage returns to highest qualifications, estimated on the full

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[35] The exception being Chapter 9, where the unobserved differences were controlled for by first-differencing.

working age sample, are shown in Table 3 of their report, with the key results for intermediate vocational qualifications repeated in our Table 10 below. They record both the highest academic and the highest vocational qualification held by each individual. The interpretation of the coefficient on any variable measuring highest vocational qualification is therefore the estimated average difference in wages between individuals who have reached that level of vocational attainment and individuals with no *vocational* qualifications, holding constant academic attainment at some fixed level.

Table 10: Returns to Vocational Qualifications as Highest Qualifications, Full Sample Results

	Qualification	All	Male	Female
Jenkins *et al.* (2007)	BTEC Level 3	**9***	**9***	**8***
	City & Guilds Level 3	**12***	**10***	0
	ONC/OND	**16***	**16***	**7***
	RSA Level 3	**10***	**2**	**14***
	NVQ3	**6***	**7***	**5***
	BTEC Level 2	**5***	**4***	**5***
	City & Guilds Level 2	-1	-3*	-0
	RSA Level 2	**4***	-5	**6***
	NVQ2	-4*	-7*	-2*

Notes: 1. The returns reported here are calculated as $e^{\beta} - 1$, where, β is the estimated coefficient in the log-linear wage equation.
2. * statistically significant at the 5% level or better
3. Positive estimates shown in bold, non-positive in gray.

Looking first at NVQ3 qualifications, these achieve a small, positive and statistically significant return when held as an individual's highest vocational qualification, of around 6% (5% for females and 7% for males). Other Level 3 vocational qualifications earn significantly higher returns when held as an individual's highest vocational qualification, such as BTEC nationals at 9% (8% for females and 9% for males), City and Guilds

Advanced Craft/Part 3 at 12% (10% for males though zero for females)[36], ONC/OND at 16% (7% for females and 16% for males), and RSA Advanced Diploma at 10% (14% for females, though only 2% and statistically insignificant for males). Thus, again NVQs appear to be the least valuable of the set of vocational qualifications. The difference in returns across genders, particularly noticeable for City and Guilds and RSA qualifications, is almost certainly due to the skills and the jobs to which these qualifications lead, City and Guilds leading mainly to skilled manual jobs, whilst RSA qualifications are more relevant to secretarial and administrative jobs.

Turning to Level 2 vocational qualifications, the result that stands out is the estimated negative marginal returns of -4% to NVQ2 (-2.5% for females and -7% for males, all statistically significant). The literal interpretation is that someone who acquires an NVQ2 as their highest qualification actually harms their labour market chances, and would have been better off without the qualification. Whilst we cannot prove or disprove this interpretation with cross-sectional data such as the LFS, it sounds a very unlikely scenario, as discussed in Chapter 2.3 above. At worst we might expect a qualification to be worthless and have zero value, but to actually reduce an individual's wages is another matter. A more plausible explanation of these negative estimated returns is the presence of the negative biases discussed in Chapter 2.2 above. Thus, when compared to individuals without an NVQ2, individuals with an NVQ2 are likely to be, on average, of lower ability and work in lower-paying jobs. It is these reasons, rather than the acquisition of the NVQ2 per se, that causes their lower wages. If we consider that the estimated returns to a qualification should be at worst zero, then the negative returns discussed above provide a lower bound estimate of these extent of the negative biases.

Some other Level 2 vocational qualifications do yield positive economic value when acquired as a highest qualification. This is the case for BTEC First/General Diplomas at 5% (5% for females and 4% for males, all statistically significant), and RSA Diplomas at 4% (6% for females, though zero for males, the female and 'all workers' results being statistically significant). City and Guilds Craft/Part 2 qualifications do not, however, yield a positive marginal return, for either men or women.

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[36] While it might appear unusual that the estimated return across both genders is higher than both of the gender-specific returns, when we might have expected the total return to lie between the male and female returns, in principle there is no reason why the former situation cannot emerge. The former situation is more likely to occur when the proportions of the two genders holding the qualification are likely to be very different, as is the case with City and Guilds here. Thus compared to *men* with no vocational qualifications , men with City and Guilds Advanced Craft as their highest qualification earn 10% more, but when comparing *all* individuals at City and Guilds Advanced Craft level to *all* individuals with no vocational qualifications, the estimated return is higher at 12%, since the treatment group has barely changed, still being dominated by males, whilst the control group has been expanded to include females, who have lower wages on average, hence increasing the size of the estimated return.

Summary

Most of the returns to intermediate vocational qualifications discussed in Part B of this report compared the wages of individuals with the qualification of interest, to a selected comparison group of individuals with no or only low level qualifications. This was because, to admit highly qualified individuals such as graduates into the control group without the vocational qualification of interest may well bias the estimated returns. Although researchers can control for the fact that the graduates hold a degree, they cannot control for differences in unobserved characteristics between the graduate and the intermediate vocational qualification holder, such as ability, motivation, etc. If the graduate holds more productive such unobserved characteristics, then the estimated returns to the vocational qualification would be biased downwards.

The results reviewed in this section show the impact, on the estimated returns to intermediate vocational qualifications, of not restricting the control group to individuals with low or no qualifications. As expected, the estimated returns are lower than the equivalent ones discussed in Part B, and in some case for Level 2 qualifications are now negative.

Thus the estimated returns in this section show that an individual with an NVQ2 or City and Guilds Craft qualification as their highest qualification will earn less on average than the average person with no vocational qualifications (but with academic qualifications in most cases), controlling for differences in academic qualifications held as well as for other observed differences in characteristics, but not controlling for differences in unobserved characteristics. We would argue that the lack of control for such unobserved characteristics means that such estimates as reviewed in this section are of less use for answering the specific question posed in the Introduction of how much economic value would a particular individual obtain following the acquisition of an intermediate vocational qualification. The average wages of all individuals are not a good estimate of such a person's wages if they had not acquired the vocational qualification, because individuals who acquire such qualifications do not come from the average parts of the employment characteristics distribution.

The estimated returns to other intermediate vocational qualifications will be similarly affected, to a greater or lesser extent depending on the unobserved characteristics of the individuals who acquire them. Other than NVQ2 and City and Guilds Craft, no other intermediate vocational qualifications attract negative returns in these specifications. Thus, at Level 2, BTEC and RSA attract returns of 5% and 4% respectively (the latter observed for females only). At Level 3, all vocational qualifications attract positive and

statistically significant returns in this specification, ranging from 16% for ONC/OND to 6% for NVQ3.

12. The Marginal Returns to Intermediate Vocational Qualifications, by Age of Acquisition

Another area where is may be possible to identify variation in the returns to intermediate vocational qualifications, and so potentially reveal circumstances where they have positive economic value, is in terms of the age at which individuals acquire them. Jenkins *et al*. (2007) is the only study to have considered this issue, and so there is no replication of their results available in the literature.[37] They use a question included in the LFS since 2001 concerned with the age at which respondents acquired their highest qualification (their Appendix Table B1). This variable is interacted with the qualification variables in order to determine how the estimated returns vary with age of acquisition. The key results are shown in our Table 11 below.

Table 11: Returns to Intermediate Vocational Qualifications as Highest Qualifications, by Age of Acquisition

	Qualification	Under 25	25+
	BTEC Level 3	44*	25*
	City & Guilds Level 3	29*	21*
	ONC/OND	48*	39*
	RSA Level 3	27*	31*
Jenkins *et al.* (2007)	NVQ3	38*	21*
	BTEC Level 2	27*	25*
	City & Guilds Level 2	12*	11*
	RSA Level 2	28*	19*
	NVQ2	21*	3*

Notes: 1. The returns reported here are calculated as $e^{\beta} - 1$, where, β is the estimated coefficient in the log-linear wage equation.
        2. * statistically significant at the 5% level or better

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[37] The specification they estimate does not limit the control group to those with low or no qualifications, but rather the wage equation is estimated on the full sample. It is for this reason that this section is included here in Part C of the report, rather than earlier in Part B, when others variations in returns across characteristics were considered.

The results apparently show vey healthy returns to NVQ2s, of 21% to those who acquired the NVQ2 aged under 25, though only 2.5% for those aged 25 and over. Other Level 2 qualifications also have large returns particularly for the under 25s, such as 27% to BTEC First/General Diplomas and 28% to RSA Diplomas.

These estimates are from a 'highest qualification' specification, and therefore represent the *total* returns to all qualifications acquired up to the highest level achieved, measured relative to individuals with no qualifications. However, the LFS only reports the age of acquisition once for the individual's highest qualification, whatever that is. The authors therefore could not include highest academic qualification and highest vocational qualification separately in their estimated equation, as they had done in their main specifications discussed above, but only highest qualification, regardless of type. The estimated returns to any vocational qualification indicated to be an individual's highest qualification will therefore be the sum of the returns to all qualifications held, *including* any academic qualifications ranked below the individual's vocational qualification classed as their highest qualification. Also this equation was estimated on the full sample, rather than only on a sample of low-qualified individuals, so there will be individuals in the sample with the full range of other qualifications. In the highest qualification variable in the LFS, holding GCSEs is actually ranked below all vocational Level 2 qualifications. Thus, if an individual holds both GCSEs and a vocational Level 2 qualification, the latter will be classified as their highest qualification, and the estimated 'highest qualification' returns to the vocational qualification will include the returns to the GCSEs. This could explain the apparently high estimated returns to vocational Level 2 qualifications in this specification. An examination of LFS data for 2008 reveals that, among *all* individuals recorded with NVQ2 as their highest qualification, 54% also hold GCSEs at grade C or above, and 23% hold 5 or more GCSEs at grade C or above. Furthermore, the holding of GCSEs amongst those with NVQ2 recorded as their highest qualification is more prevalent amongst the under 25s than amongst those aged 25 and above, so that the under-25s vocational returns will be more contaminated by GCSEs, which could explain the higher estimated returns amongst the under 25s noted above. Again in the 2008 LFS, 72% *of the under 25s* with NVQ2 recorded as their highest qualification also hold GCSEs at grade C or above, compared to 49% *of those aged 25 and above* (36% and 19% respectively for 5 or more GCSEs at grade C or above).

Summary

A question in the Labour Force Survey allows researchers to record the age at which respondents acquired their highest qualification. Such information is useful when continuing to answer the question for whom intermediate vocational qualifications have

the greatest economic value. The results suggest that the young receive more economic value from such qualifications than older workers, with apparently very large returns to all intermediate vocational qualifications for the under 25s, even when compared to all individuals without such qualifications, rather than to specific low-qualified control groups. However, a problem with such evidence exists, with age at acquisition only asked once in the survey about the individuals' highest qualification, so that researchers cannot separately control for highest academic and highest vocational qualification. Any estimated return to a vocational qualification as highest qualification will therefore incorporate the returns to any academic qualifications held up to the level of that vocational qualification, and so provide an upwardly biased estimate of the economic value of the vocational qualification.

13. Average Returns to Intermediate Level Vocational Qualifications

In the methodology discussion in Chapter 4.4 above, a distinction was made between average and marginal returns, where the former are the estimated returns averaged across all individuals to have acquired the qualification in question, while marginal returns estimate the gain in wages from acquiring a qualification amongst the marginal learners, i.e. those who have reached this level and gone no further, so that the acquisition represents their new highest level of attainment. It has been argued above that the marginal returns are more relevant to policy-makers, since policy is more interested in the value of raising attainment and skills in the workforce to new higher levels. At the very least, policy-makers would want to separate the value of qualification acquisition at a new higher level of attainment from the value of qualification acquisition that is *not* at a new highest level, to determine how resources and attention should be divided between the two. Thus we are not saying that acquisition when not the new highest qualification is unimportant, and this sub-section attempts to redress the fact that it has so far been largely ignored in this review.

Unfortunately, it is difficult to obtain information on the value of such acquisition from the available literature. The results to be reviewed in this section are average returns, averaged across *all* individuals who have acquired a particular qualification, whether it is their new highest qualification or not. In principle, it would be possible to remove from the sample all individuals for whom the qualification under consideration was their highest qualification, and estimate the returns to that qualification for the remainder. None of the papers reviewed do this, however, and so no such results can be discussed here. Furthermore, such results would still not really be answering the question that we would like to be answered: the economic value (change in wages) from acquiring a qualification when one already has a qualification at the same or higher level. In order to answer such

a question, it would be necessary to know which qualifications were already held at the point of acquisition of each subsequent qualification. This would be impossible to do in a cross-sectional data set where individuals are observed at a single point in time and asked questions about the qualifications they hold and the wages they earn at that point in time. Such an analysis could therefore only be conducted with longitudinal data, so that the point of acquisition of each qualification could be observed, as well as the other qualifications already held by individuals at that point in time. The birth cohort data sets therefore could potentially be used, though even in this case, the respondents are only observed a limited number of times in their lives, and if more than one qualification is acquired between data sweeps, it would not be known which had been acquired first. Of potentially more use would be administrative data that matched records of learners to tax records of their earnings. If this could be done continuously throughout individuals' working-age lives, then it would be known what qualifications were already held at the point of acquisition of each subsequent qualification. Of course, background characteristics are likely to be in short supply in administrative data sets, though first-differenced equations could be estimated since the data would be longitudinal, and so any characteristics that remain fixed over time would drop out of a first-differenced specification.

For now, however, all we have are the estimates of average returns, across all individuals holding a qualification, whether acquired as their new highest qualification or not. On the assumption that the return will be larger when a qualification is acquired as a new highest qualification than when it is not, these average returns across all holders of a qualification will therefore present an upper bound on the estimated returns to acquiring a qualification when not as a new highest qualification.

Numerous papers have estimated average returns to qualifications across all individuals holding those qualifications. Examples include Dearden *et al.* (2002), McIntosh (2004), Dearden *et al.* (2004), Dickerson and Vignoles (2007), Jenkins *et al.* (2007) and Dickerson (2008). All of these papers use LFS data, over different time periods from 1998 to 2006. Their results are all very similar, showing that returns to most qualifications have been largely stable over this period. Therefore only the results from Jenkins *et al.* (2007) will be discussed here, as they are the most recent, and also the most detailed, in terms of considering different comparison groups as well as the overall average.

The average returns to all qualifications for their full sample are found in their Table 2, with the results of interest reported in our Table 12 below. As explained above in Chapter 4.4, the interpretation of the qualifications' coefficients in an 'all qualifications'

specification is the average difference in wages between individuals with and without the qualification in question, holding constant other qualifications held as well as the personal characteristics included in the equation.

Table 12: Average Returns to Intermediate Vocational Qualifications

	Qualification	Control Group	All	Male	Female
Jenkins *et al.* (2007)	BTEC Level 3	All	**8***	**8***	**8***
	City & Guilds Level 3	All	**4***	**3***	-2
	ONC/OND	All	**9***	**8***	**7***
	RSA Level 3	All	**6***	-5	**10***
	NVQ3	All	0	-0	**1***
	BTEC Level 2	All	**4***	**6***	**3***
	City & Guilds Level 2	All	-1	-1	-3*
	RSA Level 2	All	**1**	-7*	**5***
	NVQ2	All	-7*	-9*	-6*
	BTEC Level 3	Voc L3 and below	**12***	**11***	**12***
	City & Guilds Level 3	Voc L3 and below	**7***	**5***	**1**
	ONC/OND	Voc L3 and below	**15***	**15***	**8***
	RSA Level 3	Voc L3 and below	**11***	0	**15***
	NVQ3	Voc L3 and below	**3***	**3***	**5***
	BTEC Level 2	Voc L2 and below	**8***	**9***	**6***
	City & Guilds Level 2	Voc L2 and below	**1**	**1**	**1**
	RSA Level 2	Voc L2 and below	**12***	**8**	**14***
	NVQ2	Voc L2 and below	-3*	-5*	-2*

Notes: 1. The returns reported here are calculated as $e^{\beta} - 1$, where, β is the estimated coefficient in the log-linear wage equation.
   2. * statistically significant at the 5% level or better
   3. Positive estimates shown in bold, non-positive in gray.

At Level 3, there is a zero estimated return to NVQ3 averaged across all workers. For females only, the average return is positive and statistically significant, though small in size at 1%. For males only, the return is again zero. Other Level 3 qualifications fare better in terms of their average returns: BTEC Nationals earn a statistically significant 8% return for both genders, ONC/OND qualifications earn a 9% return (7% for females and 8% for males, all statistically significant), City and Guilds Advanced Craft/part 3 earns a statistically significant 4% return (3% for males but a negative 2% for females, both statistically significant), and RSA Advanced Diplomas earn a 6% return (10% and statistically significant for females, but negative and statistically insignificant for males).

At Level 2 the situation is not as good for vocational qualifications. The worst case is NVQ2, for which the estimated returns are -7% on average and statistically significant (-6% for females and -9% for males). Only BTEC First/General Diplomas earn a positive and statistically significant average return of the Level 2 qualifications (4% for both genders together, 3% for females and 7% for males). Also RSA Diplomas earn a positive and statistically significant return of 5% for females only.

Jenkins *et al.* (2007) also estimate their average return/all qualifications specification for the same specific comparison groups as they discussed above for marginal returns. The reason, as before, is that considering all individuals without vocational qualifications may not be the most appropriate comparison group, given that group will include academic high achievers who will differ in unobserved ways that cannot be controlled for.

At Level 2, the only comparison group considered is those with at best another Level 2 vocational qualification other than the one in question and at best Level 1 academic qualifications.[38] The results are shown in Table 4 in Jenkins *et al.* (2007), and our Table 12 above. NVQ2 qualifications receive a negative and statistically significant return, overall and for each gender separately. The other Level 2 vocational qualifications do however attract positive and statistically significant returns, relative to this comparison group. These are small at 1% for City and Guilds Craft/part 2 (1% and statistically insignificant for each gender separately), but larger for BTEC First/General Diploma at 8% (6% for females and 9% for males) and for RSA Diploma at 12% (14% for females and a statistically insignificant 8% for males).

The same procedures are also adopted to estimate the average returns across all individuals who hold Level 3 vocational qualifications, relative to a comparison group of individuals whose highest vocational qualification is at best at Level 3 and whose highest

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[38] The other comparison group used when considering marginal returns, i.e. those with no qualifications at all, is not used here, because by definition the Level 2 qualification would also be the highest qualification relative to this group, and so the estimated returns would be the same as the marginal returns discussed earlier.

academic qualification is at best at Level 2. The results are reported in their Table 26, and our Table 12 above. In this specification, the average returns to all vocational Level 3 qualifications are positive and statistically significant. The lowest returns are to NVQ3 at 3% (5% for females and 3% for males). Such returns are dominated, however, by those to BTEC Nationals at 12% (12% for females and 11% for males), ONC/OND at 15% (8% for females and 15% for males), RSA Diplomas at 11% (15% for females though zero for males), and City and Guilds Advanced Craft at 7% (5% for males though a statistically insignificant 1% for females).

Before leaving this section, one other paper of interest using the 'average returns' specification is Dickerson (2008), who considers how returns vary across the four countries of the UK. His specification estimates average returns on a full sample (rather than relative to specific control groups), and so is comparable to the results in the upper panel of our Table 12 above. He groups qualifications together by level and type, however, rather than consider each qualification separately. The results, in his Table 7, show negative average returns for males to Vocational Level 2 qualifications in each country of the UK except Northern Ireland, with all estimates being statistically insignificant except that for England, due mainly to small sample sizes in the other countries. For females, the Vocational Level 2 returns are negative in each country, of a similar size (5-7%) in each country, and statistically significant in each country except Northern Ireland. At Level 3, the returns to vocational qualifications for males are positive and statistically significant in all four countries, at a very similar level (5-7%) in England, Scotland and Wales, and a little higher in Northern Ireland (9%). For females, the Level 3 returns are smaller at around 2% in each country, except Scotland where they are negative (statistically significant only in England). Dickerson's general conclusion is that the returns to qualifications do not vary to any great extent across the four countries of the UK.

Summary

Almost all of the results reviewed in earlier sections of this report have been 'marginal returns', that is the wage return to acquiring a qualification as a new highest qualification. We would also like to know the economic value of qualifications that are not individuals' new highest qualification (i.e. they already hold other qualifications at the same or higher level than the new qualification). In the absence of such results in the literature, the only information we do have is on average returns to qualifications, across all individuals who hold the qualifications, whether as a highest qualification or not.

The results show that, with the exception of BTEC Level 2 qualifications, no other Level 2 vocational qualification achieves a positive and statistically significant average return, with some (NVQ2 and City and Guilds Craft) attracting negative returns. Such results are telling us that individuals with, say, an NVQ2 earn less on average than individuals without an NVQ2. This comparison holds constant other qualifications held, and other observable characteristics, but not unobservable characteristics. As first discussed in Chapter 2.2 above, and at numerous points since, differences in unobservable characteristics between those with and without an NVQ2 qualification are likely to be biasing such estimates downwards. These estimates therefore do not provide a useful answer to the question posed in the Introduction, about the extent to which a particular individual's wage will increase following the acquisition of an NVQ2 qualification. This is because the wages of individuals without such a qualification do not provide a good estimate of the wages an NVQ2-holder could expect if they had obtained the qualification (because NVQ2 holders are too different in unobserved ways from the average person without an NVQ2).

Restricting the comparison group by removing any individual with higher level qualifications (i.e. restricting it to individuals with at best Level 2 vocational qualifications and Level 1 academic qualifications) will reduce this problem of bias, though probably not remove it completely, since NVQ2 holders may still have lower employability characteristics than this reduced control group. With this comparison group, the estimated returns to BTEC Level 2 and RSA Level 2 are positive, healthy and statistically significant, though City and Guilds Craft returns are tiny and NVQ2 returns remain negative.

At Level 3, the estimated average returns to all vocational qualifications except NVQ3 are positive and statistically significant when the comparison group is unrestricted, and are positive and statistically significant for all vocational qualifications including NVQ3 when the comparison group is restricted to lower qualified individuals.

The main message of this section comes from comparing the average returns across all individuals holding each qualification relative to specific comparison groups (the lower half of our Table 12) to the marginal returns across only individuals holding a qualification as their highest qualification (the lower half of our Tables 1 and 2). The returns in the latter case are significantly larger. Therefore the economic value of an intermediate vocational qualification is larger when it is raising an individual's level of attainment, and is their new highest qualification. Adding in individuals for whom the qualification is not their highest (and so averaging returns across all individuals with the qualification) is associated with significantly lower returns, as the results in this section show.

14.   The Returns to Intermediate Level Academic Qualifications

This review has focussed throughout on vocational learning and qualification acquisition. Simply to provide a comparison, this sub-section will briefly present the returns to academic qualifications at the same intermediate (Levels 2 and 3) levels that have been the focus throughout.

As has been noted by many commentators, the estimated returns to academic qualifications are substantially larger than the estimated returns to vocational qualifications, though as has been pointed out on numerous occasions, originally by Dearden *et al.* (2002), the gap narrows considerably when one estimates the returns per year of study, takes into account the typically longer periods of study for academic qualifications. The likely positive bias on estimated returns to academic qualifications as discussed in Chapter 2.1 above should also be borne in mind when considering the results in this section.

Most of the papers reviewed above include estimates of the returns to academic qualifications, since they are typically included as control variables even when the focus of attention is on vocational qualifications. Here we only report the academic returns estimated by Jenkins *et al.* (2007), as the most up-to-date estimates and based on the largest sample, using LFS data from 1997 to 2006. All estimated returns, shown here in our Table 13 below, are highly statistically significant.

Table 13: Average Returns to Intermediate Academic Qualifications

	Qualification	All	Male	Female
Jenkins *et al.* (2007)	2+ A Levels	**14***	**14***	**14***
	1 A Level	**6***	**5***	**7***
	5+ O Levels	**29***	**32***	**27***
	5+ GCSEs	**11***	**11***	**9***
	1-4 O Levels	**14***	**15***	**13***
	1-4 GCSEs	**5***	**5***	**5***

Notes: 1. The returns reported here are calculated as $e^{\beta} - 1$, where, β is the estimated coefficient in the log-linear wage equation.
          2. * statistically significant at the 5% level or better.

On average, estimated across all individuals who hold the qualifications rather than just those who hold the qualifications as their highest[39], individuals with more than 1 A level earn 14% more than an individuals without such qualifications (also 14% in each case for men and women separately, from their Table 2). At Level 2, the authors interestingly differentiate between holders of the old O Level qualifications, and holders of the more modern GCSEs[40]. They find that individuals with 5 or more O Levels earn on average 29% more than individuals without (27% for females and 32% for males). However, individuals who hold 5 or more GCSEs earn on average only 11% more than individuals without such qualifications (9% for females and 11% for males)[41].

For completeness, we also describe the marginal returns to intermediate academic qualifications estimated by Jenkins *et al.* (2007), found in their Table 3 and repeated in our Table 14 below (i.e. the total returns to just reaching that level, estimated on a full sample of all working individuals). Individuals with 2 or more A Levels as their highest qualification earn on average 44% more than individuals with no qualifications (42% for females and 45% for males). Individuals with 5 or more O Levels as their highest qualification earn on average 32% more than individuals with no qualifications (29% for females and 35% for males). Finally, individuals with 5 or more GCSEs as their highest qualification earn on average 25% more than individuals with no qualifications (24% for females and 26% for males).

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[39] It is often argued that it is the average rather than the marginal return that is of more interest with respect to academic qualifications. As discussed earlier in this report, academic qualifications are usually taken in strict progression up a hierarchy, with relatively few individuals who qualify for the next level in the hierarchy not taking up the option to study at that level. Estimating the returns to, say GCSEs, as a highest qualification is therefore using a small self-selected group of individuals who have acquired such qualifications but have chosen not to progress to A levels. The returns they earn may therefore be not representative of the returns to all people who hold GCSEs. Any bias could go either way, depending on why the individuals decided not to pursue their academic studies. If they did so due to lower unobserved ability, they might receive lower returns than the average GCSE holder, though if they did not pursue their studies due to the offer of a good job, they might receive higher returns.
[40] The authors include age in their estimated equations, and so control for the fact that the GCSE holders will be younger than the O Level holders.
[41] Recall from the discussion of average returns in Chapter 4.4 above that the returns are cumulative across qualifications in such a specification. The results in Table 13 therefore do not suggest that someone with A Levels earns less than someone with O Levels. The 14% return to holding two or more A Levels is *on top of* any return individuals have obtained from prior qualifications such as O Levels.

Table 14: Marginal Returns to Intermediate Academic Qualifications Held as Highest Qualifications

	Qualification	All	Male	Female
Jenkins *et al.* (2007)	2+ A Levels	44*	45*	42*
	1 A Level	34*	34*	35*
	5+ O Levels	32*	35*	29*
	5+ GCSEs	25*	26*	24*
	1-4 O Levels	18*	19*	16*
	1-4 GCSEs	14*	15*	14*

Notes: 1. The returns reported here are calculated as $e^{\beta} - 1$, where, β is the estimated coefficient in the log-linear wage equation.
          2. * statistically significant at the 5% level or better.

Summary

Intermediate academic qualifications (A Levels, O Levels and GCSEs) earn substantial positive returns. Individuals reaching Level 3 via the academic route (two or more A Levels) earn on average about 44% more than individuals with no academic qualifications.

Comparing the returns to intermediate academic qualifications with the returns to intermediate vocational qualifications (for example, comparing marginal returns to highest qualification relative to no specific comparison group – that is, full sample results - in our Tables 14 and 10 for academic and vocational respectively) shows that the academic returns are substantially larger. For example, the highest marginal return to a Level 2 vocational qualification in Table 10 is the 5% return to a BTEC Level 2 qualification, compared to the 32% return to 5+ O Levels in Table 14 (the worst academic Level 2 return being still 14% in Table 14, for 1-4 GCSEs). At Level 3, the highest marginal return to a vocational qualification in Table 10 is the 16% return to an ONC/OND qualification, compared to the 44% return to 2+ A Levels in Table 14.

Before it is concluded that it is always better for individuals to follow an academic route, however, the theoretical discussion in Chapters 2.1 and 2.2 above must be recalled. It is likely that these estimated returns are likely to be biased due to the omission of variables

to control for ability and motivation, for example. Given it is reasonable to expect that those with the highest ability have acquired academic qualifications, and vice versa for vocational qualifications, due to the nature of the education system that pushes most young people through the system as far as their ability will take them, the bias in the estimated returns to the two types of qualification will go in opposite directions, the estimated returns being upwardly for academic qualifications and downwardly biased for vocational qualifications. In addition, academic qualifications typically require a longer time investment from participants than vocational qualifications. Once these two factors are taken into account[42], the differential in the rates of return to investments in academic and vocational qualifications will be narrower than a simple comparison of estimated returns (as in Tables 10 and 14) would imply, though still favouring academic qualifications.

15.   Employment Effects of Intermediate Vocational Qualifications

So far, this review has only concerned itself with estimated wage returns. There is, however, another impact of qualification acquisition on labour market outcomes, namely the probability of obtaining a job in the first place. This section therefore briefly reviews the evidence on this latter outcome. Before we do, however, a caveat must be mentioned with respect to such estimates. Any estimated positive relationships observed between vocational qualification acquisition and employment likelihood should be considered as an association only, rather than causal, particularly in cross-sectional evidence. The direction of causality between such variables is much less clear for vocational qualifications than for academic qualifications. While the latter are typically obtained before labour market entry, this is not the case for vocational qualifications. Thus, an individual could well be in employment already, and be undertaking a vocational qualification to satisfy some requirement of their job, so that the causality runs *from* employment *to* vocational qualification acquisition.

Typical results are reported by Jenkins *et al.* (2007). Considering first a sample of active individuals (thus omitting the inactive who are out of the labour force altogether), they examine the relationship between holding qualifications and the probability of being employed rather than unemployed. Considering a 'highest qualification' specification with no restrictions placed on the sample (i.e. the specification does not include only low qualified individuals), the results in their Table 60 show that most Level 3 vocational qualifications are associated with a statistically significantly higher probability of being in employment, relative to individuals with no qualifications, though the effects are small in

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[42] See Dearden *et al.* (2000) as an example of a paper that explicitly takes into account the time taken to acquire qualifications, when the returns to academic and vocational qualifications are compared.

size, typically between 1 and 2 percentage points. At Level 2 the effects are even smaller, and statistically insignificant in a number of cases.

An alternative specification is to consider all individuals of working age, not just the active, and so include the inactive. The estimated relationships are stronger in this case, though it may be the reverse causality argument that is strengthened by the inclusion of the inactive, since the motivation to acquire vocational qualifications will be very low amongst those with no attachment to the labour market. Jenkins *et al.* (2007) report the results of such a specification in their Table 62. Level 3 vocational qualifications are associated with a higher probability of employment, by typically between 12 and 17 percentage points. The Level 2 results are similarly larger when the inactive are included in the sample, rising up to 14 percentage points for NVQ2 (19 percentage points for women and 8 percentage points for men).

The birth cohort data sets could help in distinguishing the direction of causality between holding a vocational qualification and being in employment, since they observe the same people at different points in time, and so provide information about which came first.[43] This is done by De Coulon and Vignoles (2008) using BCS data. They examine whether individuals were in employment (rather than unemployed or inactive) in 2000 and 2004, as a function of whether or not qualifications were obtained in the prior period. For males (their Table 10b) they do not find any statistically significant effects of qualification acquisition between ages 26 and 34, and subsequent employment likelihood. For females (their Table 10a), women who obtained an NVQ2 between 1996 and 2000 were 10 percentage points more likely to be employed in 2000 than those women who did not acquire an NVQ2, an effect that is statistically significant. For the period between 2000 and 2004, this effect becomes statistically insignificant, though it remains positive at 5 percentage points.

Summary

There is evidence of a positive association between holding vocational qualifications and being in employment, though the direction of causality is not clear (i.e. which came first). The association is stronger when the inactive are included in the estimating sample. This shows the association between vocational qualifications and being in employment versus inactivity is greater than the association between vocational qualifications and being in employment versus unemployment.

[4343] There are, of course, the usual caveats with using the birth cohort data sets, such as smaller samples, being somewhat dated as far as education is concerned, findings that strictly speaking cannot be generalised to the wider population but are only relevant to the cohort in question, etc.

16.   Conclusions

This report has reviewed recent evidence on the labour market returns to qualifications, with a focus on intermediate vocational qualifications.

Estimated across all individuals, those who hold vocational qualifications at Level 2, particularly NVQs, are observed to earn lower wages than those who do not hold vocational qualifications at Level 2. This review has tried to argue that, although this result is undoubtedly true in the aggregate, it does not mean that if an individual was to acquire one of these qualifications, that they would be worse off, compared to if they themselves continued in their current situation without the qualification. Indeed, it would be hard to think of an explanation for why such an effect could happen in the labour market. This review has therefore looked at other evidence on returns in the literature, that perhaps gets closer to telling us what would happen to a particular individual's wages, if they acquired a vocational qualification, all other things remaining constant, including the job that they do. As an example, we want to know what would happen to the wages of an individual, who was already working in an occupation such as machine operatives or hairdressers, say, who then undertook some training relevant to their chosen occupation, which was certified upon completion with an intermediate vocational qualification. We have argued that the returns mentioned at the start of this paragraph, estimated with a full sample of working age individuals, would not give us an accurate estimate of the returns in this situation. This is because such estimates are obtained by comparing all individuals with a vocational qualification against all individuals without that qualification. These two groups will, however be too different in terms of unobserved characteristics such as ability, motivation, experience etc. In addition, the types of job done by someone who chooses or is required to obtain an NVQ will be very different, and typically lower-paying, than the jobs facing an individual with academic qualifications. Any difference in earnings between these two groups is therefore more likely to be determined by differences in their unobserved characteristics and job status, rather than by the fact that one group holds a vocational qualification and the other does not.

Therefore, we have emphasised the results that estimate returns relative to a carefully chosen comparison group, who will be more similar in terms of unobserved characteristics, and results that estimate returns within a particular occupation or industry. The comparison groups chosen are typically low qualified individuals, or in some cases individuals with no qualifications at all. Even in the case of unqualified individuals, such a control group could still include relatively skilled individuals, since particularly older workers would often leave school with few qualifications but learn their jobs skills through work experience. We have also focussed on results where the qualification being

considered has been obtained as the individuals' new highest qualification and so taken them to a higher level of attainment, as opposed to the acquisition of qualifications at the same level as, or even at a lower level than, individuals' existing qualifications.

The results relative to particular comparison groups, but not occupation or industry-specific (Chapter 5 above) show that even in this case, the estimated returns to NVQ2 qualifications (our Table 1) are typically small (and non-existent for males), though they are healthier for other Level 2 vocational qualifications (our Table 2). This shows the importance of also looking within occupations or industries. When we do this (Chapter 8 above), we find that in particular occupations (such as skilled manual occupations and personal services) and particular industries (such as public administration, education and health), the estimated returns to NVQ2 qualifications are positive and statistically significant (our Tables 5 and 6). Therefore an individual going into one of these sectors with no or only low level qualifications, but subsequently acquiring an NVQ2, can expect to earn higher wages, perhaps around 10% higher, than their colleagues who remain at the lower level of attainment.

Further work has shown that vocational qualifications are more valued when they are obtained through work rather than through an education institution or government training (Chapter 6 above, our Table 3), with apprenticeships appearing a particularly valued form of training (Chapter 10 above). There is also some evidence to suggest that lower ability individuals benefit more from acquiring vocational qualifications (Chapter 7 above, our Table 4).

There is some evidence that the returns to intermediate vocational qualifications when held as highest qualifications are improving somewhat over time. Most of the evidence for this comes from comparing the results of Dearden *et al.* (2004) and Jenkins *et al.* (2007), the former using LFS data for the period 1996-2002 and the latter for the period 1997-2006 and so incorporating more recent data. For example, using this comparison, the returns to NVQ2 held as a highest qualification relative to specific comparison groups have improved (Table 1 in this report), as well as the returns to NVQ2 held as a highest qualification, obtained via the employer route, relative to specific comparison groups (Table 3 in this report). In addition the results for recent apprenticeships obtained by McIntosh (2006) show higher returns than results using earlier data, as reported in Chapter 10 above.

One question that is difficult to answer with the existing evidence, however, is to what extent an individual who is already qualified at a similar or even higher level, can increase their wages through acquiring an intermediate vocational qualification. Further research

will be required to answer such a question, with longitudinal data that frequently observes people throughout their lives being necessary, so that we can observe what qualifications are held before and after an occurrence of learning, as well as the wages earned before and after that training.

This review has therefore shown that, although on average individuals with intermediate vocational qualifications earn less than individuals without intermediate vocational qualifications, such comparisons are affected by the unobserved characteristics of the individuals in the two groups, as well as by the nature of the jobs that they do. When individuals acquiring intermediate vocational qualifications are compared to only lower qualified individuals (who provide a better estimate of the situation for the former group if they had not acquired the qualification), and particularly when compared to lower qualified individuals in the same occupation or industry, then positive returns to intermediate vocational qualifications are observed when held as individuals' highest qualification. What we have not been able to say is the value of qualification acquisition when not attained as a highest qualification (i.e. when individuals already hold a qualification at the same or even higher level).

It would seem that further longitudinal evidence in the returns literature is required. The minimum requirements for such data would be to include information on individuals' wages, occupation, industry and qualifications at each point in time, though of course information on as many additional background characteristics as possible would be useful. In particular, the information on qualifications held at each point in time would help identify situations in which a qualification is acquired as the individuals' new highest qualification, or whether they already hold qualifications at that or indeed at a higher level. The wage data could then be used to identify the wage change that occurs following qualification acquisition in each of these circumstances. There is also of course the additional advantage of longitudinal evidence and wage-change equations that any unobserved characteristics that remain constant over time would drop out of such a specification and so not bias the results.

The obvious problem with this is obtaining the data. At present in the UK, the only longitudinal data sets are the birth cohort data sets, which are now quite old, and only observe individuals at infrequent points in time, which presents various problems as discussed in Chapter 9 above. Alternatively there is the British Household Panel Survey, which observes respondents every year, but has a too small sample size to analyse detailed qualifications separately. Administrative data is probably the best solution, and should be able to provide wage and sector information at frequent points in time. The challenge will be to obtain and incorporate qualification acquisition data at frequent points

in time into administrative data sets. If this could be done, then we could absolutely answer the question posed in the Introduction concerning the value of qualification acquisition to particular individuals.

Appendix A.   Vocational Qualification Attainment Amongst the UK Population

Table A1 contains information on the proportion of the UK working-age population holding each of the vocational qualifications identified in the Labour Force Survey.

Table A1: Proportion of UK Working Age Population Holding Each Vocational Qualification

	All	Male	Female
Level 5			
Higher degree	4.26	5.08	3.46
NVQ5	0.18	0.20	0.16
Level 4			
Degree (first degree or other HE)	17.81	17.41	18.20
HNC/HND/BTEC higher	4.90	6.59	3.23
RSA Higher diploma	0.08	0.01	0.14
NVQ4	0.85	0.73	0.96
Level 3			
2+ A Levels	23.30	23.18	23.42
ONC/OND/BTEC national	3.87	4.75	3.00
C&G advanced craft	3.51	6.03	1.04
RSA advanced diploma	0.13	0.03	0.23
NVQ3	5.36	4.52	6.19
Level 2			
5+ GCSEs at grade C or above/1 A Level	43.59	41.73	45.41
BTEC first/general diploma	0.54	0.50	0.57
C&G craft	3.66	5.83	1.51
RSA diploma	0.23	0.08	0.38
NVQ2	5.98	4.92	7.02
Level 1			
Some GCSEs but <5 at grade C or above	21.05	21.16	20.93
BTEC first/general certificate	0.32	0.34	0.31
C&G other/part I	5.21	7.64	2.82
RSA other	3.51	0.49	6.48
NVQ1	1.82	1.67	1.97

Source: Labour Force Survey 2008. All qualifications categories include 'equivalents', for example, Scottish qualifications.

The information is obtained from the 2008 survey, pooling together the 4 quarterly surveys from that year, and only using information for people in waves 1 and 5, to ensure that no individual is in the annual data set twice. The LFS asks respondents to report all qualifications that they hold, and so the categories in Table A1 are not mutually exclusive. However, within qualification categories, the LFS asks respondents to report their *highest* qualification, so that an individual with an NVQ2 and an NVQ3, for example, would only report their NVQ3 qualification. This will lead to an under-estimate of the proportions with certain qualifications, particularly at lower levels.

The results show only a small minority of the working age population holding any vocational qualification. The most popular vocational qualifications are NVQ3 and NVQ2, held by 5% and 6% of the working age population respectively. There are differences by gender, with NVQs and lower level RSA qualifications being the most frequently held by women, whilst City and Guilds are the most popular amongst men.

In contrast, the academic qualifications are held by significant numbers of individuals. Approaching one-half (44%) of the working age population hold 5 or more GCSEs at grade C or above, or academic equivalents, and approaching one-quarter (23%) of the working age population hold 2 or more A Levels, or academic equivalents. At the top end, 18% of the UK working population hold a degree (either a first degree or other HE qualifications below degree level). 4% hold a higher degree.

Table A2 shows the proportion of the total number of individuals with each intermediate (Level 2 or 3) qualification, who hold that qualification as their highest. More specifically, the table shows the proportion of all people with each vocational qualification who have at best academic qualifications at the level below and at best vocational qualifications at the same level[44]. This reflects the samples used for many of the specific comparison group estimates discussed in Part B of this report. For example, the second row shows that of those holding an ONC/OND/BTEC National (Level 3) qualification, just over half (51%) have no academic qualifications above Level 2 and no other vocational qualifications above Level 3. Similarly, the final row shows that of those holding an NVQ2 qualification, just over half (51%) have no academic qualifications above Level 1 and no other vocational qualifications above Level 2.

The figures in Table A2 show that significant numbers of intermediate vocational qualifications are held by individuals as their highest qualification.[45] Level 3 qualifications

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[44] For the academic qualifications in the table, this condition changes to having no other academic qualifications at a higher level and at best vocational qualifications at the same level.
[45] Note that the numbers in the table will be an over-estimate of the true proportions, since some individuals who hold the qualification but not as their highest are not recorded if they hold higher qualifications of the

are, as expected, more likely to be held as individuals' highest qualification than Level 2 qualifications. At Level 2, which receives the most attention in this report, qualifications held as individuals' highest qualification (which were the focus in Part B in particular) represent around half of all NVQs attained, 41% of Level 2 BTECs attained, 36% of Level 2 RSA qualifications and just 19% of City and Guilds vocational qualifications. Amongst the Level 2 qualifications, NVQs are therefore most frequently held as highest qualifications. There is no consistent pattern across qualifications in terms of whether men or women are most likely to hold intermediate vocational qualifications as their highest.

Table A2: Proportion of those Holding each Qualification who hold it as their Highest Qualification

	All	Male	Female
Level 3			
2+ A Levels	31.3	31.7	31.0
ONC/OND/BTEC national	51.1	46.8	57.9
C&G advanced craft	77.6	79.0	69.9
RSA advanced diploma	67.7	44.2	70.5
NVQ3	70.1	70.3	70.0
Level 2			
5+ GCSEs at grade C or above	23.5	20.3	26.4
BTEC first/general diploma	41.2	42.6	40.0
C&G craft	18.9	15.7	31.3
RSA diploma	36.3	50.8	33.5
NVQ2	51.1	45.8	54.8

Source: Labour Force Survey 2008. All qualifications categories include 'equivalents', for example, Scottish qualifications.

Table A2 also shows that at Level 3, and at Level 2 for all vocational qualifications except City and Guilds, where academic qualifications are held they are much less likely to be held as individuals' highest qualification. This reflects the more frequent progression from one level to the next for academic qualifications compared to vocational qualifications. Thus, around one-third of all people with two or more A Levels have those qualifications as their highest, the remainder having progressed to higher qualifications (most often, a

same type (i.e those with an NVQ2 not recorded if they also hold an NVQ3) thus reducing the denominator of the proportions, and so increasing the numbers in the table.

degree).   Similarly, 24% of all people with five or more good GCSEs have those qualifications as their highest (20% for males and 26% for females).

References

Card, D. (1999) 'The Causal Effect of Education on Earnings', in *Handbook of Labor Economics*, vol. 3A, edited by O. Ashenfelter and D. Card, North-Holland.

Dearden, L., McIntosh, S., Myck, M. and Vignoles, A. (2000) 'The Returns to Academic Vocational and Basic Skills in Britain'. Skills Task Force Research Paper 20.

Dearden, L., McIntosh, S., Myck, M. and Vignoles, A. (2002) 'The Returns to Academic and Vocational Qualifications in Britain', *Bulletin of Economic Research*, Vol. 54, p. 249-274.

Dearden, L., McGranahan, L. and Sianesi, B. (2004) 'An In-Depth Analysis of the Returns to National Vocational Qualifications Obtained at Level 2'. Centre for the Economics of Education Discussion Paper 46.

De Coulon, A. and Vignoles, A. (2008) 'An Analysis of the Benefit of NVQ2 Qualifications Acquired at Age 26-34'. Centre for the Economics of Education Discussion Paper 106.

Dickerson, A. (2005) 'A Study on Rates of Return to Investment in Level 3 and Higher Qualifications'. DTI Research Report.

Dickerson, A. And Vignoles, A. (2007) 'The Distribution and Returns to Qualfications in the Sector Skills Councils'. Sector Skills Development Agency Research Report 21.

Dickerson, A. (2008) 'The Distribution and Returns to Qualifications in the Four Countries of the UK'. Sector Skills Development Agency Research Report 21a.

Jenkins, A., Vignoles, A., Wolf, A. and Galindo-Rueda, F. (2002) 'The Determinants and Effects of Lifelong Learning'. Centre for the Economics of Education Discussion Paper 19.

Jenkins, A., Greenwood, C. and Vignoles, A. (2007) 'The Returns to Qualifications in England: Updating the Evidence Base on Level 2 and Level 3 Vocational Qualifications'. Centre for the Economics of Education Discussion Paper 89.

McIntosh, S. (2002) 'Further Analysis of the Returns to Academic and Vocational Qualifications'. DfES Research Report 370.

McIntosh, S. (2004) 'The Impact of Post-school Vocational Qualifications on the Labour Outcomes of Low-achieving School Leavers in the UK'. Centre for Economics Performance, London School of Economics, mimeo.

McIntosh, S. (2005) 'The Returns to Apprenticeship Training', *Journal of Education and Work*, Vol. 18, p. 251-282.

McIntosh, S. (2006) 'A Cost-Benefit Analysis of Apprenticeships and Other Vocational Qualifications'. DfES Research Report 834.

Metcalf, D. (2008) 'Why has the British National Minimum Wage had little or no impact on employment?', *Journal of Industrial Relations*, Vol. 50, p. 489-512.

Schuller, T., Bynner, J. Green, A., Blackwell, L., Hammond, C., Preston, J. and Gough, M. (2001) 'Modelling and Measuring the Wider Benefits of Learning: a Synthesis'. Centre for Research on the Wider Benefits of Learning Monograph. Institute of Education, University of London.

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