

# **The Determinants of Undertaking Academic and Vocational Qualifications in the United Kingdom**

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## Executive Summary

What determines the path of qualification attainment in the United Kingdom? This is a simple enough question on the surface though surprisingly the answer is not.

There is a vast body of economic and educational research that has focused on the determinants of qualification attainment and the decision to remain in schooling beyond the minimum school leaving age. The answers are straightforward: those with a higher measure of innate ability are more likely to undertake additional qualifications or remain in full-time education than those with lower levels of measured ability. These findings have resulted in methodological developments: the evolution of Instrumental Variables techniques and selection models to counteract the endogeneity of schooling in rate of return analyses.

However, the work to date has focused on the determinants of the level of qualification attainment, never specifically on the determinants of the type of qualification attained or questioned why a specific path of qualification attainment has been adopted in the first place. There has never been a thorough analysis of whether those with academic qualifications are inherently more able than their vocational counterparts. Using information from the National Child Development Study, this paper illustrates the fact that innate ability (as measured by reading and mathematical test scores at the age of seven) does have an influence in determining the path of qualification attainment<sup>1</sup> at high levels of qualification but has no explanatory power at low levels of qualification. It is actually the case that combinations of regional, other personal and family characteristics are influential in the adoption of the academic or vocational route. This is a result and has both economic and social implications. On the economic front, the academically trained consistently earn a statistically significant wage premium over their vocational counterparts holding the level of qualification constant. This is invariant to the data source and alternative methods of model specification.

Traditionally, it might have been thought that this earnings gap is simply a reflection of the ability gap between the two types of individual. Since the earnings differential cannot be attributed to ability (at low levels of qualification), then the question that remains is what does determine the unequal reward of academic and

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<sup>1</sup> It is noted at this stage that the attainment of qualifications in this study refers to the mid 1970s and thus policy conclusions may be limited.

vocational qualifications in the labour market and maybe more importantly, why do low level vocational qualifications carry so little weight or currency in the labour market. Why is there no tendency whatsoever for this apparent disequilibrium to collapse. It is unhelpful to think of the academically trained as being able and their vocational counterparts being relatively unable. There is a strong implication in this work (though not proven beyond doubt due to the nature of the data) that the earnings potential of an individual is determined by the type of qualification undertaken, which in turn is determined not by ability but “even less fair” factors such as region of residence and parental social class.

The Secretary of State for Education recently indicated that higher education should not be the “birthright of the middle classes”<sup>2</sup>. Unfortunately it is and it is not just the apparent social dichotomy in higher education that should worry policy makers. Policy makers must start decompartmentalising academic and vocational qualifications and realise that the current method of qualification provision, the associated attitudes towards vocational qualifications and the resulting minimal currency vocational qualifications have in the labour market are creating inconsistencies and socially suboptimal outcomes in both the education and labour market.

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<sup>2</sup> Speech to University Vice-Chancellors, London Guildhall, 22<sup>nd</sup> October 2001.

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# 1. Introduction: Theoretical Background and Rate of Return Analysis

This paper consists of two analyses. First, we look at the determinants of the level of qualification attained, irrespective of it being academic or vocational. Secondly, we analyse the determinants of the type of qualification attained, whether academic or vocational, holding the level of qualification constant, according to the National Vocational Qualification classification of qualifications.

The first question refers to how far an individual climbs the qualification ladder and the second question analyses which qualification ladder is adopted.

The analysis explores whether measures of innate ‘ability’, teacher rating of student performance and other personal or family background characteristics at a young age are important in determining the level of qualification attained and what factors, if any, determine the type of qualification attained? Why might this be important?

Historically, the educational system in the United Kingdom has been of a dichotomous nature. Students considered to be at the higher end of the ability range have chosen the academic route from the age of sixteen, and providing they are successful at GCSE level, progress to GCE ‘A’ level, generally followed by University<sup>3</sup>. The academic route has been characterised by the most “able” individuals competing within a national framework, where central government has generally determined both the content and the assessment of curricula. On the other hand, the vocational route has been broadly characterised as being for the benefit of those who have not achieved in the academic component of the National Curriculum. For these individuals, the traditional options have been to find a trade apprenticeship, receive on the job training, or undertake any one of a wide range of vocational qualifications, whose content and assessment have been determined to a greater or lesser extent at local level<sup>4</sup>. The fact that these vocational qualifications have been so numerous and scattered has added to the belief that those holding vocational qualifications might be inferior in ability, possibly resulting in or accounting for worse employment or wage outcomes compared to those holding academic qualifications.

What does the economic literature relating to the returns to qualifications or years of schooling say about the different characteristics and outcomes achieved by the academically and vocationally trained? This can be considered in two parts: the first stressing outcomes

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<sup>3</sup> Explicit reference to the determinants of acquisition of GCE ‘A’ levels and the progression to University are explored by Blundell *et al.*, (1997) and will be discussed in the following sections.

<sup>4</sup> See Cruz-Castro (2000) for a detailed historical discussion of the provision of vocational training in the United Kingdom.

and how qualification holders are rewarded in the labour market and the second emphasising the associated characteristics of qualification holders. These two strands of work are considered together for ease.

Common analysis in human capital literature compares the labour market and/or earnings outcomes across qualification levels, generally (though not necessarily) for a given type of qualification. This branch of the literature incorporates several analyses of the private returns to education<sup>5</sup> in the United Kingdom over recent years, which focus on the effect of education and the possession of qualifications on employment outcomes and earnings. In related strands of the literature, there have been attempts to illustrate what features of employees determine whether an employer will provide privately funded training<sup>6</sup>. If training is provided, will this training will lead to a formal qualification and will this training be of the general transferable type or of a firm specific nature?<sup>7</sup> In earlier studies, attempts were made to highlight and understand the characteristics of individuals who undertook trade apprenticeships and completed trade apprenticeships compared to those that did not manage to complete the apprenticeship<sup>8</sup>. More recently, Blundell (2000) looks at individuals who achieved the necessary conditions to progress to third level education, but did not, as well as the outcomes, in terms of employment and wages of those completing degrees versus those achieving qualifications below degrees.

The questions that all these analyses concern themselves with revolve around is whether there are different personal characteristics associated with individuals who achieve different levels of qualification, levels of training provision or labour market outcomes. These analyses, however, do not question whether there are fundamentally different personal characteristics between individuals in possession of different types of qualification attained at a particular level. This point is non-trivial. The questions that are being asked and answered to date are along the lines of: “What is the difference in innate ability between those who have degrees and those who do not?”; “What is the difference in ability between men who undertake and complete apprenticeships as opposed to those that undertake, yet do not complete apprenticeships?” or “What are the differences between individuals who receive general privately funded training and those that do not?” These questions are intuitive to answer. One would clearly expect the more able (however this might be measured) to

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<sup>5</sup> Harmon and Walker (1995), Bennett, Glennerster and Nevison (1995), Blundell *et al.* (1997), Chevalier and Walker (1999), Dearden, McIntosh, Myck and Vignoles (2000), Walker and Zhu (2001).

<sup>6</sup> Blundell, Dearden and Meghir (1996).

<sup>7</sup> Dearden (1997).

<sup>8</sup> Booth and Satchell (1994).



achieve higher levels of qualification, undertake formally recognised privately funded employer training, complete apprenticeships and attain higher levels of employment and wages. As previously stated, there are some fundamental questions that have been simply overlooked:

- Does innate ability determine both the level *and* the type of qualification attained?
- What are the differences in innate ability between those that undertake academic or vocational qualifications, when the level of qualification is controlled for?
- What are the implications for existing rate of return analyses?

It appears reasonably clear that innate ‘ability’ does have a statistically significant role in the determination of qualification attainment<sup>9</sup>, but there is nothing at all strange about this. How might this be illustrated? Using information from the National Child Development Study, one would expect that individuals with higher innate ability in the form of mathematical and reading test scores at the age of seven or eleven would achieve higher levels of qualification attainment than their less able counterparts (although it is clear that these variables are imperfect measures of innate ability<sup>10</sup>). However, the question that the above analyses concern themselves with is whether there is any difference in the personal characteristics of individuals achieving different levels of qualification, not what factors determine the type of qualification that is attained at a particular level.

The analysis of the determinants of the route of qualification attainment is important because of the implications the results (irrespective of what they are) have on all rate of return analyses. Most analyses of the rate of return to additional years of schooling or qualifications are plagued with difficulties associated with the endogeneity of schooling. Higher ability individuals undertake additional qualifications compared to lower ability individuals and thus the coefficients produced in any standard wage or employment equation provide estimates that reflect the joint effect of ability and qualifications on earnings. Despite the fact that techniques have been adopted to isolate the problem of the endogeneity

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<sup>9</sup> Similarly, Booth and Satchell (1994) undertake an analysis of trade apprenticeships in the pre-Thatcher era, and discuss the difference in family background between those that undertake apprenticeships as opposed to those that do not and the difference between those that complete apprenticeships as opposed to those who do not. The comparison is made between their employment outcomes in the first employment experience. The results are unsurprising. Dearden (1997) analyses the effect of privately funded employer training on worker mobility. As a precursor to this analysis, using information from the National Child Development Study and the panel component of the Labour Force Survey, the first question that is asked is what type of individual receives privately funded employer training. Not unsurprisingly, there are strong indications, according to both of the data sources, that the more highly qualified are more likely to receive training. This is unsurprising, as there appear to be strong ability factors determining the level of qualification attainment. Therefore it simply appears to be the case that privately funded training is provided to the high ability employees.

<sup>10</sup> There are also important issues in the National Child Development Study relating to the distribution of test scores at age seven. See Conlon (2000) for a detailed discussion of alternative ability metrics.

of schooling, such as Instrumental Variables or Heckman Selection techniques, most analyses that attempt to compare the outcomes of individuals with different levels of educational attainment remain somewhat problematic. However, these analyses are attempting to compare those with different levels of qualification (and presumably ability) and thus the results produced do not reach some of the more fundamental issues such as why individuals undertake a particular qualification route or the relative rewards associated with adopting one particular type of qualification as opposed to another holding the level of qualification constant.

In the United Kingdom, the NVQ classification<sup>11</sup> of qualifications across categories attempts to group qualifications equivalently in terms of time required to achieve the qualification and/or entry requirements. In one of the few examples of this branch of the literature, Robinson (1997) attempted to illustrate the fact that individuals with academic qualifications, who are employed, outperform those with vocational qualifications to a statistically significant extent in terms of earnings. The implication is that those with academic qualifications are better rewarded than those with vocational qualifications in the labour market by approximately one level. Explicitly, those employed individuals holding academic qualifications at NVQ level 2 have similar (or greater) earnings than employed individuals holding vocational qualifications at NVQ level 3<sup>12</sup>. However, in this analysis, no attempt is made either to correct for possible self-selection into the academic or vocational qualification stream or selection into employment in the first place. To evaluate the merit of these analyses, this paper questions the fundamental assumption that the academically qualified have higher innate ability compared to their vocational counterparts.

At given levels of qualification, we analyse whether there is any difference in ability (as measured by mathematical and reading test scores from the National Child Development Study) between the academically and vocationally qualified<sup>13</sup>.

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<sup>11</sup> The concept of equivalence of qualifications across type is discussed in detail in the Appendices.

<sup>12</sup> Note that this analysis only compares the incomes of those individuals who are employed. When considering the expected income associated with various levels of educational attainment, the likelihood of employment of the academically and vocationally qualified (relative to someone with no qualifications) has been overlooked but must be taken into account. It would be thought that, as a result, Robinson's results probably underestimate the expected income differential across qualification type. A detailed analysis of the differential in the rates of return to the academically and vocationally trained is explored in Chapter 3, where corrections for the endogeneity of schooling, qualification type attainment and employment are explicitly controlled for. A comprehensive analysis of the various issues associated with the estimation of the rate of return to qualifications is presented by Blundell *et al.*, (1997) and Dearden, McIntosh, Myck and Vignoles (2000).

<sup>13</sup> General and transferable skills are defined against specific skills, as not being tied to any particular firm, sector or work process but as being applicable to a wide range of educational and professional situations. The term covers many different skills such as entrepreneurial (creativity, risk-management, responsibility, decision-making skills and initiative) interpersonal skills (flexibility, conflict-handling, team-building and other

What are the implications of this analysis for rate of return analysis?

Suppose that the hypothesis being tested is that the academically trained achieve statistically significant higher scores in mathematics and reading tests at the ages of seven and/or eleven (as might be considered entirely plausible by the general reader). If it is found that this indeed the case, then the implication is that standard rate of return analyses that do not take into account selection into alternative routes of qualification attainment as well as the level of qualification attained will produce biased estimates. In particular, assuming that there is a consistent classification of qualifications<sup>14</sup> (according to the National Vocational Qualification classification of qualifications), then the estimates of the return associated with academic qualifications will be overestimates of the true return to the academic qualification and estimates of the earnings differential between the academically and vocationally trained will be attributable to both ability and the type of qualification.

Suppose that the hypothesis is rejected. The implication of this finding is that there is no statistically significant differential in innate ability (as measured by test score performance at a young age) between the academically and vocationally trained. If again the assumption is made that there is a consistent classification of academic and vocational qualifications, then the empirical results indicating that there is substantial earnings differential between the academically and vocationally trained require additional analysis to understand why such a differential in earnings exists and persists. The second point of interest if this hypothesis is rejected relates to understanding what factors actually do determine whether academic or vocational qualification are undertaken. Do family background or regional factors play a role in the route of qualification attainment or does the answer relate to the social or economic environment in which the individual lives?

If there is an earnings gap between the academically and vocationally trained, then there is an implication that the type of qualification undertaken determines the earnings potential of an individual. If the path of qualification attainment is not determined not by ability but “even less fair” factors such as region of residence and parental social class, then the current method of qualification provision and the associated attitudes towards vocational qualifications are creating inconsistencies, socially suboptimal and inequitable outcomes in both the education and labour market. This needs to be addressed.

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intellectual skills (mathematics, problem-solving, quality awareness, ability to learn new things the up-dating of knowledge. General skills or qualifications are broader concepts and they are usually defined against firm-specific ones. Note that the fundamental distinction between what is considered an academic or vocational qualification is contentious.

<sup>14</sup> This is a non-trivial assumption.

## 2. Data Source and Definitions

The National Child Development Study (NCDS) is a continuing longitudinal study which is seeking to follow the lives of all those living in Great Britain who were born between the 3rd and 9th March 1958. It has its origins in the Perinatal Mortality Survey (PMS), which was designed to examine the social and obstetric factors associated with stillbirth and death in early infancy among the 17,000 children born in England, Scotland and Wales in that one week. To date there have been seven attempts to trace all members of the birth cohort in order to monitor their physical, educational and social development. The first five sweeps were carried out in 1965, 1969, 1974, 1981, 1991 and most recently, 2000. In addition, in 1978, contact was made with the schools attended by members of the birth cohort at the time of the third follow-up in 1974 in order to obtain details of public examination entry and performance. The inclusion of immigrants born in the relevant week for the first three follow-ups (NCDS1, NCDS2 and NCDS3) augmented the birth cohort. The latter groups were identified from the school registers during tracing. Since 1974, no attempt has been made to include new immigrants in the survey. The NCDS contains a wealth of personal and family background information. The proxies for unobserved ability contained in the NCDS are arithmetic and reading test score at the age of seven and mathematical and reading test scores at the age of eleven. There is detailed information relating to the level and type of qualification that the cohort members have attained by the ages of 23 and 33. This information regarding qualifications is more detailed than any other data set available at the time. In addition, there are substantial amounts of information relating to the years of schooling, social class, economic activity, as well as accommodation details and family background information, such as the number of siblings that the cohort member possessed or the birth order of the child.

One of the most difficult issues associated with analysing this topic is the coding of the data to reflect comparability of academic and vocational qualifications within particular levels of qualification and whether a particular qualification is academic or vocational in nature.

It is clear that it is almost impossible to completely classify qualifications according to either 'level' or 'type' in any coherent manner. However, it was decided to consider the

specific entry requirements and the time taken<sup>15</sup> to compete the qualification in question as a possible basis for equivalence. For some qualifications, it is clear what the entry requirements are; however, there are still many situations in which the data does not allow us to be more stringent in our classification. For instance, for a person who has obtained a higher degree, it is clear that the entry requirement will be an undergraduate degree. However, there is no information available regarding the grade of the undergraduate degree required or the quality of the institution involved. Therefore, we are forced in many respects to adopt the lowest common denominator in terms of entry requirement.

Historically, there has been a distinct lack of a centralised structure concerned with the award and validation of vocational qualifications (Cruz-Castro, 2000). It is only since the creation of the National Council for Vocational Qualifications that there has been a unified approach to the provision and award of vocational training and qualifications<sup>16</sup>.

Therefore, for many of the qualifications that we are considering, there are organisation specific entry requirements (*e.g.* EdExcel, formally BTEC; RSA; C&G). The entry requirement for most courses, both academic and vocational, is dissimilar between institutions. It is important to stress this point more fully. There is a common belief that the variation in entry requirements is restricted to the provision of vocational qualifications. It is also the case that entry requirements for academic programmes are equally dissimilar across institutions, at all levels of qualification. In the case of the provision of many academic and vocational qualifications, the validating authority makes no decision regarding the suitability of the existing qualifications of the potential students at the point of entry but simply validates (or not) the qualification at the point of exit. The classification of qualifications for this analysis is presented in Table 1.

The second problem associated with the classification of academic and vocational qualifications is the fundamental definition of what exactly constitutes an academic or vocational qualification. This point is non-trivial. Taking some examples, the boundaries between what exactly constitutes an academic or vocational qualification are not clear. Most people might claim that an individual possessing a university degree is academically trained. However, it is also clear that the subject of the degree level qualification is important. In criticism of previous work (Conlon, 2000), the unilateral categorisation of university degree holders as being academically trained was questioned, as those holding medical or veterinary

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<sup>15</sup> Note that the time taken to complete the qualification is crucial in moving from an analysis dealing with the returns to qualifications to a rate of return analysis. In Dearden *et al.*, (2000) this point is illustrated more fully.

<sup>16</sup> Until recently, there were over 60 organisations capable of awarding vocational qualifications.

degrees (say) could generally be considered as possessing qualifications that are vocational in nature. Defining qualifications according to the nature or the specificity of the skills that are possessed does not alleviate the problem. Even if we consider that academic qualifications endow their recipients with skills that are considered to be general or transferable and the holders of vocational qualifications as possessing firm specific skills, then we might have a suitable starting point for the classification of qualifications. However, it could still be claimed that an individual possessing RSA qualifications working as a secretary (who is defined as vocationally trained in this analysis) holds general transferable skills and should be considered to be academically qualified according to our definition. Conversely, a vet possesses extremely firm or industry specific skills and thus should be considered vocationally trained. To achieve a strict classification of qualifications according to whether they are academic or vocational is a major piece of research in its own right<sup>17</sup>.

I adopt the classification of qualifications (according to type) that is presented in Table 1. It is imperfect but acceptable given the fact that the data limitations due to the small sample size in the NCDS do not allow the comparison of ‘ability’ measures for every individual category of qualification.

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<sup>17</sup> For a detailed discussion of the classification of qualifications according to the NVQ classification of qualification, refer to Conlon (2000). The decision was taken to analyse the determinants of qualification attainment at age 23 (in 1981) due to the larger sample available compared to 1991. In addition, using data relating to 1991 or 2000 (which was unavailable at the time of writing) might result in inaccuracies due to the fact that cohort members are responding about events possibly 15 years previously.

**Table 1: Description of Academic Qualifications by NVQ equivalent: National Child Development Study (5<sup>th</sup> Follow Up)**

<b>NCDS Description of Highest Qualifications</b>	<b>Type</b>	<b>NVQ Equivalent</b>
University or CNAA Higher Degree – MSc, PhD, etc	ACADEMIC	5
University or CNAA Post Graduate Diploma	ACADEMIC	5
University or CNAA First Degree – including B Ed	ACADEMIC	4
University or CNAA Diploma or Certificate	ACADEMIC	4
Certificate (NOT CNAA VALIDATED)	ACADEMIC	4
Nursing qualifications - Nursing (NNEB)	VOCATIONAL	4
BTEC HNC/ HND	VOCATIONAL	4
HNC/HND (or SHNC/SHND)	VOCATIONAL	4
Full professional qualification: Membership awarded by professional	ACADEMIC	4
Part of professional qualifications e.g.: Part I of two part course	ACADEMIC	4
City and Guilds Full Technological (FTC)	VOCATIONAL	4
More than 1 GCE 'A' Level	ACADEMIC	3
ONC/OND (or SNC/SND)	VOCATIONAL	3
National General Certificate or diploma	VOCATIONAL	3
Scottish CSYS	ACADEMIC	3
Scottish Higher Grade	ACADEMIC	3
City and Guilds Advanced/Final/Part II or III	VOCATIONAL	3
RSA – Stage 3	VOCATIONAL	3
1 GCE 'A' Level	ACADEMIC	2
Scottish Standard Grades – grades 1-3	ACADEMIC	2
Scottish 'O' grade – passes or grades A-C	ACADEMIC	2
5 or more GCE O Level passes or grades A-C	ACADEMIC	2
5 or more GCSE grades A-C	ACADEMIC	2
CSE grade 1	ACADEMIC	2
JIB/NJC or other Craft/Technician Certificate	VOCATIONAL	2
Insignia Award in Technology (CGIA)	VOCATIONAL	2
City and Guilds Craft /Intermediary/Ordinary/Part I	VOCATIONAL	2
City and Guilds – can't say which	VOCATIONAL	2
Other City and Guilds	VOCATIONAL	2
Trade Apprenticeship (No formal Qualifications)	VOCATIONAL	2
RSA – Stage 2	VOCATIONAL	2
Less than 5 GCE O Level passes or grades A-C	ACADEMIC	1
Less than 5 GCSE grades A-C	ACADEMIC	1
CSE grade 2-5	ACADEMIC	1
City and Guilds Operative	VOCATIONAL	1
RSA – Stage 1	VOCATIONAL	1
Other Technical or Business Qualifications including HGV, PSV, etc	VOCATIONAL	1
Any other qualification 1	VOCATIONAL	1
Any other qualification 2	VOCATIONAL	1
Any other qualification 3	VOCATIONAL	1
No qualifications		0

### 3. Methodology

#### 3.1 Determining the level of qualification attainment in the United Kingdom

This analysis was carried out in two stages. First, an ordered probit was estimated as follows

$$\text{oprobit} (NVQ_{ki}) = \mathbf{a} + \mathbf{b}' AB_i + \mathbf{g}' FAM_i + \mathbf{e}_i$$

where the dependent variable is the level of qualification attained by the cohort member by March 1981 (age 23).  $NVQ_{ki}$  is coded either 1,2,3 or 4, according to the level of qualification attained, irrespective of whether the qualification is academic or vocational.

The independent variables used to explain qualification attainment are broadly divided into personal characteristics and family characteristics as follows:

$AB_i$  is a vector of ability variables consisting of

- Mathematical test scores at the age of seven
- Reading test scores at the age of seven
- Oral Ability Aged 7 (Teacher Rating)
- Reading Ability Aged 7 (Teacher Rating)
- Number Work Aged 7 (Teacher Rating)
- Creative Ability Aged 7 (Teacher Rating)
- Poor Speech (Teacher Rating)
- Grasp of English (Teacher Rating)

$FAM_i$  is a vector of personal background variables consisting of

- Number of Siblings Aged 7
- Birth Order Aged 7
- Father remain in school beyond minimum school leaving age



- Family Difficulties age 7                      Housing, Financial, Illness and Disability, Mental Illness, Mental sub normality, Father's death, Mother's death, Divorce – Separation, Unemployment, In-laws, Alcohol, Other.
- Accommodation Aged 7
- Region of Residence Aged 7
- Father's Social Class Aged 7
- Mother reads to child Aged 7
- Father reads to child Aged 7
- Mother's interest in child's education (Teacher Rating) Aged 7
- Father's interest in child's education (Teacher Rating) Aged 7

### 3.2 Determining the type of qualification attainment in the United Kingdom

The second stage of the analysis involves estimating the determinants of undertaking an academic or vocational qualification, holding the level of qualification constant, as follows:

$$dprobit (ACA_i) = \mathbf{a} + \mathbf{b}' AB_i + \mathbf{g}' FAM_i + \mathbf{e}_i$$

The dependent variable is the type of qualification attained by the cohort member by March 1981, and this analysis is undertaken separately for the 4 possible levels of qualification attainment

The independent variables used to explain qualification attainment are broadly divided into personal characteristics and family characteristics as follows:

$AB_i$  is a vector of ability variables consisting of

- Mathematical test scores at the age of seven
- Reading test scores at the age of seven
- Oral Ability Aged 7 (Teacher Rating)
- Reading Ability Aged 7 (Teacher Rating)
- Number Work Aged 7 (Teacher Rating)
- Creative Ability Aged 7 (Teacher Rating)

$FAM_i$  is a vector of personal background variables consisting of

- Number of Siblings Aged 7
- Birth Order Aged 7
- Father remain in school beyond minimum school leaving age
- Family Difficulties age 7      Housing, Financial, Illness and Disability, Mental Illness, Mental sub normality, Father's death, Mother's death, Divorce – Separation, Unemployment, In-laws, Alcohol, Other.
- Accommodation Aged 7
- Region of Residence Aged 7
- Father's Social Class Aged 7
- Mother reads to child Aged 7
- Father reads to child Aged 7
- Mother's interest in child's education (Teacher Rating) Aged 7
- Father's interest in child's education (Teacher Rating) Aged 7

#### 4. Presentation of Results

Although the main focus of this paper is to analyse the determinants of undertaking academic as opposed to vocational qualifications and the associated implications for rate of return analysis (either in terms of the theoretical implications for selection models or the existing results illustrating the earnings differences between the academically and vocationally trained), it is sensible to start by looking at the determinants of the level of qualification attained to illustrate the difference in the determinants of qualification attainment.

As indicated in the previous section, an ordered probit model is estimated<sup>18</sup>, where the dependent variable consisted of the level of qualification attained according to the NVQ

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<sup>18</sup> It was decided to look at the determinants of the level and type of qualification attained using separate ordered probit and probit models. An alternative strategy would be to estimate the individual educational attainment and academic/vocational path choices simultaneously by maximum likelihood. This is computationally complex unless we reduce the number of ordered educational categories to a simple binary indicator, with consequent loss of information. A disadvantage of using the ordered probit is that the marginal effects are different for each educational category, so for simplicity we present the coefficients only. This does cause a slight difficulty in the interpretation. However, the main focus of this section should be on the signs of the coefficients presented, the

classification of qualifications and the independent variables consisted of a mixture of personal and family characteristics contained in the NCDS. In particular, these personal characteristics included test scores at the age of seven and teacher assessments of the child's performance at the age of seven in terms of oral ability, reading ability, numerical ability, creative ability, speech capability and grasp of English. For consistency, the independent variables used to explain the attainment of qualifications is identical to those variables used at a later stage to determine the type of qualification undertaken. The results relating to the determinants of the level of qualification attained for both men and women are presented in Table 2.

As would be expected, the coefficients relating to reading and mathematical test scores at the age of seven<sup>19</sup> are significant and positively related to the probability of undertaking and obtaining additional qualifications. In particular, there is an increasing relationship between performance in both reading and arithmetic at the age of seven and the likelihood of obtaining higher levels of qualification (irrespective of whether the qualification is academic or vocational). The estimates of reading test scores are statistically significant at the 1% level of confidence for both men and women, whereas the estimates of mathematical test scores are statistically significant for men at the 1% level and the 10% level of confidence for women.

Turning to alternative measures of ability at the age of seven, teacher ratings of oral ability, reading ability, numerical and creative ability at this age reinforce the conclusion that the level of qualification attained is strongly determined by intellectual and creative capability at a very young age. There is again an unambiguous relationship between improved teacher rating (any of the criteria mentioned) with the likelihood of undertaking additional levels of qualification. In addition, all these measures of teacher ratings are statistically significant for both males and females at the 5% level of significance.

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relative magnitude of the coefficients according to the response category and the statistical significance of the estimates.

<sup>19</sup> The decision was taken to use as many explanatory variables at as young an age as possible. It is also possible to carry out this analysis using reading and mathematical test scores at the age of eleven. However, it was believed that if this was done then these measures of innate ability could no longer be considered innate but joint effects of ability and schooling.

**Table 2: Determinants of the Level of Qualification Attainment at Age 23  
National Child Development Study (using information from 5<sup>th</sup> Follow Up)**

Independent Variable		Males		Females	
		Coefficient	SE	Coefficient	SE
Mathematical Test Score age 7 (Bottom Quartile)	2nd Quartile	0.148	0.058	0.015	0.053
	3 <sup>rd</sup> Quartile	0.147	0.064	0.026	0.059
	4 <sup>th</sup> Quartile	0.277	0.072	0.158	0.068
Reading Test Score Age 7 (Bottom Quartile)	2nd Quartile	0.186	0.064	0.122	0.068
	3 <sup>rd</sup> Quartile	0.253	0.071	0.295	0.071
	4 <sup>th</sup> Quartile	0.292	0.087	0.446	0.082
Oral Ability Age 7 - Teacher Rating (Average)	Very Poor	-0.433	0.142	-0.353	0.196
	Below Average	-0.091	0.066	-0.215	0.074
	Good	0.082	0.064	0.120	0.059
Reading Ability Age 7 - Teacher Rating (Average)	Expressive	0.108	0.074	-0.062	0.067
	Non Reader	-0.076	0.170	-0.327	0.265
	Poor reader	-0.094	0.069	-0.029	0.075
Creative Ability Age 7 – Teacher Rating (Average)	Above Average	0.040	0.060	0.146	0.055
	Avid Reader	-0.062	0.106	0.215	0.089
	No creativity	-0.392	0.163	-0.255	0.173
Numerical Ability Age 7 – Teacher Rating (Average)	Little creativity	-0.080	0.052	-0.209	0.053
	Good Creativity	0.105	0.060	0.054	0.054
	Marked Creativity	0.177	0.130	0.289	0.116
Poor Speech Age 7 – Teacher Rating (Don't Know)	Little Ability	-0.471	0.166	-0.422	0.169
	Slow	-0.168	0.058	-0.059	0.054
	Good	0.141	0.057	0.074	0.058
Imperfect Grasp of English – Teacher Rating (Don't Know)	Very Quick	0.147	0.106	0.110	0.122
	Does Not Apply	0.075	0.141	-0.127	0.207
	Applies	0.173	0.148	-0.061	0.217
Family Difficulties Age 7 (None)	Cert Applies	-0.722	0.484	-0.681	0.459
	Does Not Apply	-0.197	0.332	-0.374	0.442
	Applies	-0.446	0.385	-0.398	0.477
Number of Children in Household Age 7 (One)	Cert Applies	-0.130	0.367	-0.232	0.497
	One	-0.148	0.069	-0.127	0.063
	More than One	-0.196	0.084	-0.233	0.080
Birth Order Age 7 (First)	Two	0.070	0.078	0.040	0.073
	Three	-0.013	0.085	0.005	0.080
	Four	-0.057	0.094	-0.151	0.091
Region of Residence (North West)	Five	-0.079	0.123	-0.226	0.111
	More than Five	-0.265	0.134	-0.208	0.124
	Second	-0.050	0.048	-0.067	0.047
	Third	0.017	0.069	-0.048	0.066
	Fourth Lower	-0.082	0.095	-0.043	0.087
	Northern	0.025	0.095	-0.142	0.089
	E&W Riding	0.040	0.088	0.013	0.082
	North Midland	0.052	0.089	-0.130	0.087
	Eastern	-0.066	0.087	-0.003	0.081
	London and SE	0.046	0.079	-0.016	0.074
Southern	0.025	0.095	-0.081	0.092	
S Western	0.001	0.096	-0.182	0.088	
Midlands	0.040	0.087	-0.071	0.083	
Wales	-0.155	0.100	-0.067	0.096	
Scotland	0.077	0.085	-0.065	0.080	

Father's Social Class Age 7 (Professional)	Intermediate	-0.198	0.095	-0.295	0.094
	Skilled NM	-0.316	0.103	-0.396	0.101
	Skilled M	-0.421	0.094	-0.571	0.094
	Semi Skilled NM	-0.467	0.159	-0.581	0.174
	Semi Skilled M	-0.653	0.104	-0.700	0.103
	Unskilled	-0.674	0.128	-0.799	0.126
Mother read to Child (Never)	Regularly	0.058	0.049	0.073	0.047
	DK	0.031	0.065	-0.027	0.061
Father read to Child (Never)	Regularly	0.019	0.050	-0.015	0.049
	DK	-0.073	0.054	-0.014	0.051
Accommodation details (Council Rent)	Owner	-0.248	0.531	-1.124	0.535
	Private Rent	-0.061	0.065	-0.051	0.061
	Other	-0.118	0.084	-0.136	0.084
Mother's interest in child's education (No Interest)	Cant Say	0.008	0.115	0.250	0.114
	Over Concerned	0.215	0.148	0.544	0.150
	Very Interested	0.142	0.100	0.251	0.101
	Little Interest	0.042	0.087	0.150	0.090
Father's interest in child's education (No Interest)	Cant Say	0.158	0.084	0.038	0.084
	Over Concerned	0.415	0.206	0.249	0.219
	Very Interested	0.232	0.101	0.147	0.098
	Little Interest	0.252	0.088	-0.010	0.089
Father stay beyond MSLA (No)	Yes	0.186	0.053	0.222	0.051
	DK	0.213	0.155	0.227	0.129
Ancillary Parameters	$\mu$ (1)	-1.301	0.393	-1.736	0.506
	$\mu$ (2)	-0.704	0.392	-1.077	0.506
	$\mu$ (3)	0.226	0.392	-0.073	0.506
	$\mu$ (4)	1.154	0.392	0.525	0.506
	$\mu$ (5)	2.860	0.401	2.229	0.510

Number of Observations  
R<sup>2</sup>

3032  
.1066

3289  
.1164

Joint significance Tests

Mathematical Test score age 7	.0018***	.0716*
Reading Test score age 7	.0024***	.0000***
Oral ability age 7 (teacher rating)	.0135**	.0015***
Reading ability age 7 (teacher rating)	.5077	.0381**
Creative ability age 7 (teacher rating)	.0170**	.0001***
Numerical ability age 7 (teacher rating)	.0004***	.0704*
Poor Speech age 7 (teacher rating)	.1487	.4518
Grasp of English age 7 (teacher rating)	.3597	.6630
Family Difficulties age 7	.0116**	.0040***
Number of Siblings age 7	.0967*	.0219**
Position in household age 7	.5165	.5644
Region of residence age 7	.5909	.4379
Fathers Social Class age 7	.0000***	.0000***
Mother read to Child age 7	.4942	.1704
Father read to Child age 7	.2635	.9402
Accommodation details age 7	.4111	.0508*
Mothers interest in child's education age 7	.3291	.0037***
Fathers interest in Child education age 7	.0313**	.1924
Father stay beyond MSLA	.0012***	.0000***

\*\*\* 1% level of confidence, \*\* 5% level of confidence, \* 10% level of confidence

Several family background characteristics also explain the likelihood of undertaking and completing additional qualifications.

Looking at the social class of the father of the cohort member, unsurprisingly, there is a clear trend between qualification attainment and the occupational status as described by the parent. Relative to an individual whose father has a professional occupation, as we move down the occupational classification of social class, the likelihood of undertaking an additional level of qualification falls substantially. A similar phenomenon is illustrated for women and both effects are statistically significant at 1% level of confidence.

For males, other factors included in the analysis that also influence the determinants of qualification attainment include whether the family has suffered any 'difficulties' when the child was aged seven, whether the cohort member's father stayed beyond the minimum school leaving age, the interest shown in the cohort member's schooling by the father and the number of siblings in the cohort member's household<sup>20</sup>. The sign of these effects are as expected.

For female cohort members, the factors that are influential in determining the level of qualification attained are generally the same those for males, however, rather than whether the interest shown in the cohort member's schooling by the father figure, the interest shown by the cohort member's mother is illustrated to be statistically significant as well as accommodation details. It is interesting to note in this analysis some of the factors that appear to have no effect on whether the cohort member undertakes an additional qualification. In particular, the cohort member's grasp of English, the cohort member's speech (as rated by their teacher), region of residence and position within the household has little or no effect on the undertaking and completion of additional qualifications.

The next stage of the analysis is to look at the determinants of the type of qualification attained. This is infinitely more difficult than looking at the determinants of the level of qualification attained but remains the primary focus of this paper and irrespective of the results presented has important policy implications. The sample of individuals possessing qualifications has been broken down into four sub-categories corresponding to the level of qualification possessed (either academic or vocational at NVQ level 1, 2, 3 and 4). This is done in an attempt to focus solely on the determinants of the type of qualification attained controlling for the level qualification attained. This approach is plausible especially due to

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<sup>20</sup> There are several issues associated with consistency of the variables relating to teacher rating of cohort members' ability. See Sparkes (1999) for a discussion.

the nature of qualification attainment in the United Kingdom and the distinct lack of mobility between paths of qualification attainment (Conlon 2001b).<sup>21</sup> The results for males are presented in Table 3 and for females in Table 4.

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<sup>21</sup> In this work using pooled data from the Quarterly Labour Force Survey between 1994 and 2000, the likelihood of undertaking an additional academic (or vocational) level of qualification was estimated using the existing level and type of qualification as an independent variable. The results encompassing the entire population of males indicate that there is an increasing relationship between the likelihood of obtaining academic qualifications and increasing levels of academic qualification; there is an increasing relationship between the undertaking of vocational qualifications and existing vocational qualifications and a decreasing relationship between the undertaking of additional vocational qualification and increasing existing academic qualifications. Most importantly, the results presented indicate that there appears to be very little mobility between the two paths of qualification attainment. See Appendices.

**Table 3: Determinants of the Qualification attainment: Males: National Child Development Study (5<sup>th</sup> Follow Up)**

Independent Variable		NVQ Level 1		NVQ Level 2		NVQ Level 3		NVQ Level 4	
		Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE
Mathematical Test Score age 7 (Bottom Quartile)	2 <sup>nd</sup> Quartile	-0.145	0.076	0.041	0.053	0.065	0.072	-0.066	0.122
	3 <sup>rd</sup> Quartile	-0.027	0.083	0.065	0.058	0.120	0.075	-0.141	0.123
	4 <sup>th</sup> Quartile	-0.248	0.115	0.021	0.069	0.126	0.078	-0.037	0.122
Reading Test Score Age 7 (Bottom Quartile)	2 <sup>nd</sup> Quartile	0.054	0.075	-0.032	0.057	0.031	0.079	0.203	0.096
	3 <sup>rd</sup> Quartile	0.030	0.087	0.051	0.063	0.181	0.082	0.278	0.111
	4 <sup>th</sup> Quartile	-0.188	0.144	0.102	0.082	0.199	0.097	0.324	0.099
Oral Ability Age 7 - Teacher Rating (Average)	Very Poor	0.138	0.122	0.065	0.137	0.280	0.330		
	Below Average	-0.012	0.082	-0.018	0.059	0.005	0.086	-0.168	0.170
	Good	-0.043	0.116	0.084	0.063	0.068	0.058	0.069	0.067
Reading Ability Age 7 - Teacher Rating (Average)	Expressive	0.076	0.111	0.069	0.072	0.059	0.068	0.107	0.072
	Non Reader	0.226	0.105	-0.103	0.150	0.051	0.354		
	Poor reader	0.105	0.085	-0.096	0.060	-0.089	0.079	0.230	0.081
	Above Average	0.034	0.090	0.071	0.057	0.132	0.055	0.050	0.065
Creative Ability Age 7 – Teacher Rating (Average)	Avid Reader	0.035	0.233	0.117	0.124	0.308	0.090	0.215	0.085
	No creativity	0.077	0.157	0.205	0.137				
	Little creativity	0.091	0.063	0.016	0.048	0.008	0.057	-0.178	0.087
	Good Creativity	0.024	0.110	0.001	0.058	-0.061	0.051	-0.064	0.069
Numerical Ability Age 7 – Teacher Rating (Average)	Mark Creativity	0.177	0.159	0.217	0.128	0.047	0.119	0.053	0.126
	Little Ability	-0.330	0.181	-0.144	0.159	0.137	0.333		
	Slow	0.031	0.072	0.039	0.053	-0.129	0.064	-0.078	0.094
	Good	0.053	0.089	0.000	0.057	-0.021	0.049	0.118	0.060
Family Difficulties Age 7 (None)	Very Quick	-0.378	0.190	0.094	0.124	0.033	0.089	0.131	0.096
	One	-0.014	0.085	-0.028	0.061	-0.030	0.071	-0.201	0.136
	More than One	0.113	0.083	0.051	0.076	0.149	0.115	0.210	0.101
Number of Children in Household Age 7 (One)	Two	0.031	0.121	-0.133	0.071	0.006	0.074	-0.002	0.102
	Three	-0.104	0.133	-0.083	0.079	-0.005	0.080	-0.032	0.113
	Four	-0.028	0.136	-0.203	0.085	-0.009	0.097	0.041	0.116



	Five	0.031	0.161	-0.055	0.122	-0.089	0.111	0.071	0.173
	More than Five	0.133	0.131	0.052	0.132	0.007	0.148	0.081	0.214
Birth Order Age 7 (First)	Second	-0.022	0.067	0.039	0.046	-0.043	0.047	-0.022	0.065
	Third	0.037	0.084	-0.033	0.067	0.068	0.075	-0.089	0.094
	Fourth Lower	0.056	0.107	-0.113	0.095	-0.058	0.098	-0.208	0.185
	Northern	-0.135	0.130	-0.013	0.089	-0.110	0.086	0.312	0.052
Region of Residence (North West)	E&W Riding	-0.267	0.131	0.105	0.078	-0.081	0.082	0.055	0.108
	North Midland	-0.079	0.122	-0.052	0.088	-0.081	0.082	0.086	0.103
	Eastern	-0.093	0.119	0.007	0.083	-0.047	0.081	-0.037	0.122
	London and SE	0.008	0.113	0.052	0.071	0.124	0.084	0.172	0.082
	Southern	0.097	0.130	0.080	0.085	-0.028	0.089	0.097	0.106
	S Western	-0.116	0.149	-0.047	0.090	0.232	0.106	0.116	0.114
	Midlands	-0.101	0.118	-0.022	0.083	0.016	0.092	0.092	0.102
	Wales	-0.140	0.164	0.077	0.095	-0.098	0.089	0.263	0.081
	Scotland	-0.306	0.137	-0.430	0.059	0.236	0.089	0.208	0.077
Father's Social Class Age 7 (Professional)	No Male	-0.558	0.214	-0.029	0.186	-0.203	0.099	-0.359	0.217
	Intermediate	0.066	0.235	-0.034	0.116	-0.169	0.069	-0.194	0.099
	Skilled NM	-0.010	0.264	-0.048	0.121	-0.217	0.061	0.020	0.109
	Skilled M	0.184	0.241	-0.132	0.110	-0.293	0.075	-0.144	0.101
	Semi Sk NM	0.121	0.227	-0.027	0.156	-0.204	0.107	-0.034	0.221
	Semi Sk M	0.079	0.237	-0.116	0.118	-0.270	0.055	-0.336	0.133
	Unskilled	0.240	0.139	0.001	0.139	-0.212	0.080	-0.233	0.203
Mother read to Child (Never)	Regularly	0.089	0.065	-0.026	0.046	0.091	0.047	0.157	0.070
	DK	0.012	0.086	-0.036	0.063	-0.113	0.064	-0.088	0.100
Father read to Child (Never)	Regularly	-0.011	0.070	0.068	0.048	0.027	0.048	-0.123	0.064
	DK	0.107	0.071	0.048	0.051	0.070	0.064	0.081	0.077
Accommodation details (Council Rent)	Owner	-0.041	0.067	0.088	0.045	0.208	0.050	0.044	0.070
	Private Rent	-0.057	0.096	0.124	0.060	0.245	0.077	0.084	0.101
	Other	0.054	0.102	0.120	0.075	0.169	0.101	-0.004	0.128
Mother's interest in child's education (No	Cant Say	0.064	0.113	-0.076	0.111	-0.190	0.096	0.057	0.214
	Over Conc	0.311	0.040	-0.131	0.145	0.256	0.173	0.000	0.243



**Table 4: Determinants of the Qualification attainment: Females: National Child Development Study (5<sup>th</sup> Follow Up)**

		NVQ Level 1		NVQ Level 2		NVQ Level 3		NVQ Level 4	
		Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE
Mathematical Test Score age 7 (Bottom Quartile)	2nd Quartile	-0.078	0.048	0.015	0.036	0.057	0.082	0.202	3.040
	3 <sup>rd</sup> Quartile	-0.098	0.059	0.083	0.037	0.146	0.083	0.159	2.171
	4 <sup>th</sup> Quartile	-0.114	0.083	0.021	0.048	0.173	0.088	0.263	3.692
Reading Test Score Age 7 (Bottom Quartile)	2nd Quartile	0.025	0.047	0.013	0.048	-0.060	0.138	-0.059	0.620
	3 <sup>rd</sup> Quartile	0.020	0.051	-0.008	0.051	-0.162	0.134	0.031	0.383
	4 <sup>th</sup> Quartile	0.036	0.065	-0.009	0.059	-0.060	0.142	0.093	1.144
Oral Ability Age 7 - Teacher Rating (Average)	Very Poor	0.036	0.170	-0.051	0.236			-0.715	0.224
	Below Average	-0.004	0.054	-0.014	0.057	0.007	0.153	-0.122	1.024
	Good	-0.175	0.093	-0.020	0.043	-0.058	0.070	0.078	0.997
	Expressive	-0.063	0.085	-0.052	0.051	-0.030	0.083	0.133	1.873
Reading Ability Age 7 - Teacher Rating (Average)	Non Reader			-0.379	0.240				
	Poor reader	0.039	0.050	0.000	0.056	-0.309	0.130	-0.070	0.698
	Above Average	0.041	0.047	0.027	0.037	0.021	0.071	0.206	2.565
	Avid Reader	-0.342	0.204	-0.054	0.070	0.123	0.105	0.126	1.773
Creative Ability Age 7 – Teacher Rating (Average)	No creativity	0.080	0.099	0.156	0.079			-0.180	1.219
	Little creativity	0.016	0.040	-0.032	0.040	-0.003	0.089	-0.120	1.057
	Good Creativity	0.013	0.062	-0.024	0.040	-0.001	0.066	0.004	0.072
	Mark Creativity	-0.043	0.175	0.117	0.078	0.145	0.129	0.059	0.793
Numerical Ability Age 7 – Teacher Rating (Average)	Little Ability	-0.120	0.159	0.092	0.110	-0.096	0.090	0.196	3.701
	Slow	0.070	0.040	-0.062	0.039			0.227	3.768
	Good	0.047	0.052	0.006	0.041	0.042	0.069	-0.053	0.587
	Very Quick	0.128	0.061	-0.057	0.126	0.062	0.132	-0.064	0.650
Family Difficulties Age 7 (None)	One	0.073	0.042	0.009	0.042	-0.004	0.105	-0.225	1.378
	More than One	0.115	0.039	-0.121	0.071	0.150	0.141	0.054	0.738
Number of Children in Household Age 7 (One)	Two	0.009	0.065	0.008	0.049	0.149	0.095	-0.007	0.114
	Three	0.071	0.062	-0.031	0.057	0.182	0.099	-0.109	1.119
	Four	0.032	0.071	0.071	0.056	0.231	0.107	-0.070	0.711

	Five	0.058	0.072	0.068	0.066	0.144	0.155	0.006	0.179
	More than Five	0.174	0.029	0.172	0.041	0.182	0.161	-0.218	1.255
Birth Order Age 7 (First)	Second	0.099	0.037	-0.005	0.035	-0.133	0.063	-0.114	1.208
	Third	-0.054	0.063	0.043	0.046	-0.148	0.094	0.015	0.193
	Fourth Lower	0.080	0.054	-0.236	0.084	-0.130	0.142	-0.169	1.242
	Northern	0.107	0.048	0.045	0.059	-0.207	0.131	0.052	0.695
Region of Residence (North West)	E&W Riding	0.002	0.075	-0.082	0.065	0.173	0.110	0.020	0.266
	North Midland	0.097	0.051	-0.034	0.066	-0.142	0.118	-0.107	0.959
	Eastern	-0.014	0.078	-0.070	0.064	-0.167	0.107	0.070	0.948
	London and SE	0.011	0.068	-0.016	0.055	0.022	0.099	0.111	1.579
	Southern	0.006	0.078	-0.037	0.072	-0.034	0.124	-0.017	0.214
	S Western	0.085	0.054	-0.142	0.076	-0.160	0.113	-0.050	0.530
	Midlands	-0.014	0.081	-0.144	0.068	-0.152	0.111	0.018	0.240
	Wales	0.101	0.058	0.008	0.069	0.108	0.143	0.182	3.151
	Scotland	0.080	0.055	-0.402	0.109	0.195	0.095	0.095	1.320
	Father's Social Class Age 7 (Professional)	No Male	-0.871	0.016	0.138	0.067	0.394	0.121	0.036
Intermediate		-0.927	0.013	0.070	0.065	-0.138	0.101	-0.076	0.811
Skilled NM		-0.928	0.013	0.133	0.052	0.003	0.109	-0.095	0.917
Skilled M		-0.946	0.030	0.201	0.073	-0.138	0.101	-0.135	1.374
Semi Sk NM		-0.857	0.018	0.165	0.052	-0.184	0.192	-0.246	1.192
Semi Sk M		-0.980	0.007	0.138	0.055	-0.125	0.123	-0.268	1.402
Unskilled		-0.922	0.013	0.141	0.054	-0.079	0.260	0.047	0.639
Mother read to Child (Never)	Regularly	-0.003	0.040	-0.004	0.034	0.118	0.064	-0.040	0.474
	DK	0.063	0.044	-0.013	0.046	-0.052	0.087	-0.180	1.351
Father read to Child (Never)	Regularly	-0.001	0.043	0.088	0.033	-0.170	0.067	0.081	0.978
	DK	-0.051	0.046	0.103	0.032	-0.099	0.073	0.075	0.988
Accommodation details (Council Rent)	Owner	0.026	0.039	-0.010	0.033	0.047	0.066	0.110	1.159
	Private Rent	-0.030	0.058	0.049	0.043	0.031	0.087	-0.124	1.055
	Other	-0.004	0.081	0.012	0.061	0.082	0.116	-0.022	0.268
Mother's interest in child's education (No Interest)	Cant Say	-0.006	0.088	-0.044	0.092	0.145	0.213	-0.423	0.453
	Over Conc	-0.093	0.196	-0.194	0.146	0.330	0.145	-0.312	1.138

Father's interest in child's education (No Interest)	Very Interested	0.016	0.072	-0.029	0.079	0.275	0.195	-0.209	2.663
	Little Interest	-0.013	0.065	-0.045	0.073	0.141	0.192	-0.210	1.786
	Cant Say	0.055	0.058	-0.048	0.069	-0.070	0.151	0.156	2.084
	Over Conc			0.043	0.172	0.077	0.256	-0.160	1.173
	Very Interested	-0.023	0.087	-0.025	0.078	0.007	0.160	0.076	0.912
	Little Interest	0.053	0.058	-0.048	0.074	-0.024	0.159	0.123	1.776
Father stay beyond MSLA (No)	Yes	-0.026	0.057	0.041	0.034	0.115	0.062	0.172	2.078
	DK	0.068	0.076	0.147	0.045	-0.082	0.173	0.206	3.838
	obs. P	0.790036		0.766537		0.527		0.656716	
	pred. P	0.843599		0.787412		0.535		0.70641	
		562		1028		518		603	
		.1556		.0894*		.1913		.2332	
Joint Significance Tests									
	Mathematical Test score age 7	.2216		.1300		.1902		.0020***	
	Reading Test score age 7	.9492		.9450		.2362		.2528	
	Oral ability age 7 (teacher rating)	.2851		.8721		.8743		.1626	
	Reading ability age 7 (teacher rating)	.1201		.2785		.1432		.0026***	
	Creative ability age 7 (teacher rating)	.9601		.3915		.7432		.4532	
	Numerical ability age 7 (teacher rating)	.2100		.4071		.6470		.0042***	
	Family Difficulties age 7	.0545*		.1534		.6010		.0492**	
	Number of Siblings age 7	.2016		.0585*		.5228		.4577	
	Position in household age 7	.0054***		.0021***		.1744		.0669*	
	Region of residence age 7	.3404		.0022***		.0026***		.2794	
	Fathers Social Class age 7	.0000***		.0655*		.2294		.2864	
	Mother read to Child age 7	.2910		.9585		.0593*		.1251	
	Father read to Child age 7	.4708		.0039***		.0422**		.2722	
	Accommodation details age 7	.8282		.5591		.8628		.2321	
	Mothers interest in child's education age 7	.9636		.5937		.2343		.1938	
	Fathers interest in Child education age 7	.5145		.9158		.8230		.2075	
	Father stay beyond MSLA	.4586		.0286**		.6380		.0388**	
*** 1% level of confidence, ** 5% level of confidence, * 10% level of confidence									

The results in this section are somewhat surprising. The statistically significant determinants of undertaking academic or vocational qualifications for males in possession of qualifications at NVQ level 1 are mathematical test score at the age of seven, teacher rating of numerical ability and the cohort member's father's social class. In the former case, an increasing performance in test score at age 7 results in a lower likelihood of undertaking academic qualifications. The other measures of ability (whether test score performance or teacher rating of 'ability') contained in the analysis have no effect on determining the type of qualification undertaken. A similar phenomenon is illustrated for women at the lowest level of qualification attainment, except in this case; none of the measures of ability are influential in determining the type of qualification attained.

These results are repeated to a sizeable extent NVQ Level 2 for both men and women, with family background and region of residence contributing to the determination of the type of qualification attained. This is in complete contrast to the earlier analysis of the determinants of the level of qualification attained, where the 'ability' measures were all of a high degree of statistical significance. In particular, the region of residence at the age of seven and either the number of siblings or the position of the cohort number in the birth order do determine the type of qualification attained. Male cohort members living in the north, north and west midlands, south west, east, Wales and Scotland are all more likely to undertake a vocational qualification at this level of qualification, with males from London and the South East and southern regions all more likely to undertake an academic qualification relative to the reference category. Considering these results mirror industry composition at the time, the evidence suggests that one determinant of the type of qualification attained are heavily influenced by local labour market circumstances and the nature of vacancies that exist locally.<sup>22</sup>

Therefore, at lower levels of qualification, which might be attained by the time of minimum school leaving age, the determinants of the type of qualification attained are not strongly determined to performance on mathematical or reading tests at a young age nor are they determined by teacher estimates of the cohort member's academic ability. In fact, the determinants of whether academic or vocational qualifications are undertaken appear to consist of the region in which the cohort member lives, cohort members' father's social class (again) and to some extent, their accommodation or tenure details

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<sup>22</sup> Clark, D. (2002), "From 30/70 to 70/30 in 20 years: What Explains Recent Trends in Post-Compulsory Education In England?", Centre for Economic Performance, mimeo.

(which might be thought of as a proxy for household income) and birth order (especially for women).

At higher levels of qualification attainment, a different picture emerges, with performance in the reading test at the age of seven and the cohort member's teacher rating at reading playing a role in whether academic or vocational qualifications are undertaken for both males and females at NVQ Level 3 and 4.

Males in the second, third and top quartile of reading test performance at the age of seven are 3.1, 18.1 and 19.9 percentage points more likely to undertake an academic qualification compared to a male in the bottom quartile. At NVQ Level 4, the corresponding figures are 20.3, 27.8 and 32.4 percentage points. Mathematical test score performance plays no role in determining whether an academic or vocational qualification is undertaken.

The other factors that are significant in determining whether male cohort members undertook academic qualifications at NVQ Level 3 and 4 were region of residence, whether the parents of the child read to the child aged 7, the mother's interest in the child's education at the age of seven, accommodation details and the social class of cohort members' father.

For female cohort members, performance in reading is insignificant in determining the type of qualification undertaken at NVQ Level 3, but is statistically significant at the 1% level of confidence at NVQ Level 4. Females who performed in the third and top quartiles of reading test at the age of seven are 3.1 and 9.3 percentage points more likely to undertake an academic qualification than an individual in the reference category. Similar trends are illustrated for the teacher's rating of the cohort member's reading ability.

The other factors that are significant in determining whether female cohort members undertook academic qualifications at NVQ Level 3 and 4 were their teacher ratings of numerical ability, region of residence, whether the parents read to the child aged 7, whether the family underwent serious difficulties when the child was aged 7 and whether the father of the cohort member stayed in schooling beyond the minimum school leaving age.

## 5. Implications for Rate of Return Analysis

This paper has illustrated the fact that the level of qualification attained, irrespective of whether it is academic or vocational, is determined by a variety of personal characteristics, including reading and mathematical test score performance at the age of seven and various teacher assessments of academic and creative skills. These results are unsurprising. However, this work has also attempted to illustrate whether the decision to undertake academic or vocational qualifications at a given level of qualification is determined by ‘ability’ measures. The results are somewhat ambiguous.

In fact, whether ability measures are influential in determining the decision to undertake academic as opposed to vocational qualification is crucially dependent on the level of qualification in question.

At low levels of qualification (NVQ levels 1 and 2), region of residence and family background characteristics appear to determine the decision (assuming that there is some choice associated with the process) to undertake an academic qualification to some extent. Reading and mathematical test scores at the age of seven play no role whatsoever in this process. This result is similar to those presented by this author in the past using the NCDS but a slightly different method of analysis (Conlon, 2000).

At higher levels of qualification (NVQ levels 3 and 4), mathematical and reading test scores, as well as some teacher ratings of cohort members’ numerical and reading performance do appear to determine whether academic or vocational qualifications are undertaken in addition to some family background variables and the region of residence.

In addition to the findings presented here, another piece of work by this author has illustrated that there is an earnings premium attached to those in possession of academic qualification over their vocational counterparts at low levels of qualification (Conlon, 2001a). Some illustrative results are presented in the appendices. This work on the earnings outcomes achieved by males implies that men in possession of an academic qualification at NVQ Level 2 earn approximately 10% more than a male in possession of a vocational qualification at the same level of qualification while the differential in earnings widens to approximately 20% at NVQ level 4.<sup>23</sup>

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<sup>23</sup> The work on the returns to qualifications contains various models including Ordinary Least Squares, Instrumental Variables and Heckman Selection Models, which correct for selection into employment, the level of qualification *and* the type of qualification attained. The differential between the academically and vocationally trained is invariant to the model specification and the data source (and the inclusion or omission of ability proxies).



The evidence in the economic and education literature that the returns to low-level vocational qualifications are less than the returns to low-level academic qualifications and also evidence to suggest that in absolute terms, the returns to low-level vocational qualifications are negligible. The first question that arises is what accounts for this differential between the academically and vocationally trained if there is no evidence that ability plays any role in the selection process at low levels of qualification. Secondly, why is it the case that low-level vocational qualifications carry so little weight or currency in the labour market? Is it the case that employers simply do not understand the nature of vocational qualification provision in the sense that they are unsure about the actual skills held by those in possession of vocational qualifications or is it the case that the low-level vocationally trained simply under-equipped in the necessary skills required in the labour market? In other words, is the classification of academic and vocational qualifications (as used in this analysis and others) accurate or is the fundamental concept of equivalence between different types of qualification even meaningful?

On a more theoretical point, this analysis questions whether the existing estimates of returns to higher levels and types of qualification are biased since ability does play a role in selecting individuals along the academic or vocational route of qualification attainment at high levels of qualification?

What are the implications for other rate of return analyses? To my knowledge, there are very few analyses that have explicitly taken into account the possible differentials in ability and personal characteristics between the academically and vocationally trained implying that many estimates provided to date contain estimation biases. Even if these selection terms are incorporated into the rate of return analyses (Conlon, 2001a), the earnings differentials remain at all levels of qualification and thus the question remains as to why these differentials exist and persist.

The second implication of these finding relates to lifelong learning and the late attainment of qualifications. Using information from the Labour Force Survey, previous work (Conlon, 2001b) has attempted to illustrate the relationship between the likelihood of undertaking additional academic or vocational qualifications later in life and previous qualification attainment. It is illustrated that there is a substantial lack of mobility between paths of qualification attainment. In other words, those individuals already in possession of academic qualifications are significantly more likely to undertake additional academic qualifications compared to their vocational counterparts. A similar phenomenon is illustrated for the vocationally trained. Therefore, the work presented here

feeds into the late attainment of qualifications literature and indicates that due to the immobility between paths of qualification attainment, the decision to undertake academic or vocational qualifications at a young age has very long term consequences for the skill set of society.

## **6. Conclusions**

The preliminary conclusions of this analysis are not encouraging. It appears to be the case that everyone wants more vocational training except for their own children. The facts are simple. Using information from the National Child Development Study, there are indications that the level of qualification attained is determined by a mixture of personal ability and family background characteristics. The type of qualification attained at lower levels of qualification (holding the level of qualification constant) is not determined by personal characteristics as represented by ‘ability’ measures as many readers might have thought. The results indicate that at high levels of qualification, ability measures do indeed determine selection into the different types of qualification path. This has implications for rate of return analyses where there is no selection correction term into the highest type of qualification attained. Even though the academic route has been characterised by the most “able” individuals competing within a national framework, whereas the vocational route has been broadly characterised as being for the benefit of those who have not achieved in the academic component of the National Curriculum, this view is only an opinion and is not based on the ability profiles of the two groups, especially at lower levels of qualification.

The vocationally trained suffer an earnings penalty at every level of qualification relative to their academic counterparts, which increases as the level of qualification increases and exists irrespective of the method of analysis and the data source. This earnings gap cannot be attributed to ability differentials. This again is especially the case at the lower levels of qualification attainment.

Given that there is an earnings differential between the academically and vocationally trained, how can this be explained? If it the case that the academically trained are rewarded to a greater extent in the labour market, then why don’t more young people undertake and complete academic qualifications. One possibility is that there are

greater credit constraints associated with undertaking academic qualifications, which is not just limited to undertaking academic qualifications at degree level where the main focus of policies concerning widening participation and the removal of credit constraints has occurred. In particular, if the decision facing an individual is between re-sitting (say) GCSE qualifications and embarking on a vocational qualification at NVQ level 2 that combines paid work and (on the job) training, then those with higher discount rates and associated credit constraints might be more likely to undertake the vocational qualification. Those individuals that have access to greater household resources might have the option of delaying work longer and undertaking additional full time academic qualifications. Therefore it might be the case that it is not just higher education that has been the birthright of the middle classes but academic qualifications more generally. It is not just the apparent social dichotomy in higher education that should worry policy makers. Policy makers must start decompartmentalising academic and vocational qualifications and realise that the current method of qualification provision and the associated attitudes towards vocational qualifications are creating inconsistencies, socially suboptimal and inequitable outcomes in both the education and labour market.

This research topic requires additional understanding before any firm conclusions can be drawn.

## Appendices

### Routes of Progression: Characteristics Associated With Those Undertaking Additional Levels of Academic or Vocational Qualifications in the United Kingdom: 16-59 Year old Males and 16-55 Year Old Females: LFS 1996-2000 (pooled)<sup>24</sup>

Academic Qualifications	Males			Females		
	16-59	16-24	25-59	16-55	16-24	25-55
Academic Level 1	.0848 (.047)	.6695 (.070)	-.3847 (.069)	.2043 (.043)	.6277 (.066)	-.2442 (.061)
Academic Level 2	.5771 (.034)	1.4352 (.049)	-.0560 (.055)	.7153 (.031)	1.5169 (.045)	.0811 (.049)
Academic Level 3	1.2373 (.038)	2.9338 (.061)	.0401 (.059)	1.4945 (.035)	3.0278 (.054)	.4230 (.054)
Academic Level 4	1.6056 (.040)	3.4922 (.089)	.8050 (.051)	1.9419 (.038)	3.8541 (.078)	1.0897 (.049)
Academic Level 5	1.9228 (.050)	3.4649 (.188)	1.131 (.059)	2.1476 (.050)	4.1199 (.193)	1.2887 (.059)
Vocational Level 1	-.1688 (.046)	-.0533 (.070)	-.3002 (.070)	-.1754 (.029)	-.0958 (.051)	-.2196 (.038)
Vocational Level 2	-.1594 (.048)	-.0731 (.078)	-.2191 (.064)	-.1270 (.042)	.1804 (.072)	-.2392 (.055)
Vocational Level 3	.2121 (.039)	1.0379 (.069)	-.0695 (.049)	.2650 (.039)	.8202 (.064)	.0217 (.053)
Vocational Level 4	.2951 (.033)	.8450 (.077)	.1561 (.038)	.2675 (.031)	.6440 (.077)	.1501 (.034)
<b>R<sup>2</sup></b>	.2950	.4366	.1451	.2727	.4211	.1657
<b>N</b>	14558	7417	7141	18013	9129	8884

  

Vocational Qualifications	Males			Females		
	16-59	16-24	25-59	16-55	16-24	25-55
Academic Level 1	.0791 (.026)	.1731 (.038)	.0325 (.038)	.0601 (.025)	.2037 (.041)	-.0043 (.032)
Academic Level 2	.1798 (.024)	.4218 (.037)	.0502 (.033)	.1251 (.022)	.4167 (.029)	-.0160 (.028)
Academic Level 3	.1177 (.037)	.5248 (.057)	-.1075 (.051)	.0799 (.032)	.4652 (.055)	-.1233 (.041)
Academic Level 4	-.2331 (.037)	-.7836 (.092)	-.1419 (.044)	-.3494 (.032)	-.6176 (.083)	-.3551 (.038)
Academic Level 5	-.1975 (.055)	-.5795 (.242)	-.1989 (.060)	-.5571 (.055)	-.8264 (.235)	-.5883 (.059)
Vocational Level 1	.2030 (.031)	.2011 (.047)	.2333 (.044)	-.0117 (.022)	-.0079 (.046)	.0249 (.026)
Vocational Level 2	.3378 (.025)	.4555 (.037)	.2769 (.035)	.3126 (.024)	.3406 (.037)	.3256 (.032)
Vocational Level 3	.5766 (.026)	.8794 (.044)	.4692 (.033)	.4193 (.028)	.3753 (.045)	.4595 (.036)
Vocational Level 4	.3986 (.032)	.5518 (.079)	.3595 (.036)	.5836 (.027)	.1811 (.077)	.6456 (.029)
<b>R<sup>2</sup></b>	.0607	.0725	.0365	.0489	.0505	.0449
<b>N</b>	19305	7153	12152	23249	7068	16181

<sup>24</sup> Full estimates available on request

**OLS Estimates of the returns to Education<sup>25</sup> : National Child Development Study  
(Males 5<sup>th</sup> Follow Up)**

	<b>OLS (1)</b>		<b>OLS (2)</b>		<b>OLS (3)</b>		<b>OLS (4)</b>		<b>OLS (5)</b>	
<b>Schooling</b>	.038	(.002)	.014	(.003)	.013	(.003)	.033	(.002)	.012	(.003)
<b>Academic Level 1</b>			.052	(.035)	.039	(.035)			.038	(.035)
<b>Academic Level 2</b>			.232	(.032)	.201	(.032)			.190	(.032)
<b>Academic Level 3</b>			.438	(.056)	.396	(.056)			.386	(.056)
<b>Academic Level 4</b>			.444	(.035)	.404	(.036)			.387	(.037)
<b>Academic Level 5</b>			.371	(.047)	.332	(.048)			.310	(.048)
<b>Vocational Level 1</b>			.072	(.038)	.053	(.038)			.045	(.038)
<b>Vocational Level 2</b>			.103	(.032)	.089	(.032)			.084	(.032)
<b>Vocational Level 3</b>			.170	(.033)	.146	(.033)			.142	(.034)
<b>Vocational Level 4</b>			.322	(.038)	.293	(.039)			.280	(.039)
<b>Maths Test Age 7</b>										
<b>2<sup>nd</sup> Quartile</b>					.037	(.020)	.035	(.020)	.039	(.020)
<b>3<sup>rd</sup> Quartile</b>					.061	(.021)	.069	(.022)	.061	(.021)
<b>Top Quartile</b>					.086	(.023)	.109	(.024)	.086	(.023)
<b>Reading Test Age 7</b>										
<b>2<sup>nd</sup> Quartile</b>					.021	(.021)	.037	(.021)	.021	(.021)
<b>3<sup>rd</sup> Quartile</b>					.019	(.022)	.051	(.023)	.018	(.022)
<b>Top Quartile</b>					.032	(.023)	.107	(.023)	.027	(.023)
<b>Age Father Left FTE</b>										
<b>15-16 Years old</b>									.053	(.021)
<b>16-17 Years old</b>									.040	(.026)
<b>17+ Years old</b>									.079	(.025)
<b>Father's Social Class</b>										
<b>Skilled (Man/N.M.)</b>									-.028	(.015)
<b>Semi Skilled (Man/N.M.)</b>									-.046	(.024)
<b>Unskilled</b>									-.086	(.042)
<b>Sample Size</b>	3100		3100		3100		3100		3100	
<b>Adjusted R<sup>2</sup></b>	.2514		.3182		.3230		.2792		.3330	

<sup>25</sup> Standard errors are presented in parenthesis. The model specifications include an individual's ethnic characteristics, marital status, accommodation details, number of dependent children under the age of 16 and the economic activity of other members of the household. Job characteristics have also been included such as union membership, whether the job is full time or part time, temporary or permanent, in the public or private sector and the size of the firm the individual is working in. Yearly dummies have also been included.

**Instrumental Variables Estimates of the returns to Education: Males: National  
Child Development Survey (5<sup>th</sup> Follow Up)<sup>26</sup>**

	IV (1)		IV (2)		IV (3)		HECKMAN (1)		HECKMAN (2)		HECKMAN (3)	
<b>Schooling</b>	.073	(.008)	.037	(.008)	.036	(.008)	.100	(.008)	.040	(.069)	.036	(.008)
<b>Academic Level 1</b>			.091	(.035)	.085	(.035)			.069	(.034)	.060	(.034)
<b>Academic Level 2</b>			.230	(.031)	.206	(.032)			.213	(.030)	.190	(.031)
<b>Academic Level 3</b>			.469	(.067)	.441	(.067)			.413	(.413)	.379	(.054)
<b>Academic Level 4</b>			.508	(.039)	.476	(.039)			.473	(.032)	.440	(.033)
<b>Academic Level 5</b>			.469	(.047)	.436	(.047)			.434	(.042)	.400	(.042)
<b>Vocational Level 1</b>			.099	(.036)	.085	(.036)			.077	(.035)	.061	(.035)
<b>Vocational Level 2</b>			.178	(.030)	.166	(.030)			.160	(.029)	.146	(.029)
<b>Vocational Level 3</b>			.234	(.035)	.216	(.035)			.205	(.030)	.185	(.031)
<b>Vocational Level 4</b>			.364	(.038)	.340	(.039)			.337	(.035)	.312	(.035)
<b>Maths Test Age 7</b>												
2 <sup>nd</sup> Quartile					.031	(.019)					.029	(.019)
3 <sup>rd</sup> Quartile					.071	(.020)					.068	(.020)
Top Quartile					.089	(.022)					.084	(.084)
<b>Reading Test Age 7</b>												
2 <sup>nd</sup> Quartile					.013	(.019)					.012	(.019)
3 <sup>rd</sup> Quartile					.007	(.021)					.006	(.021)
Top Quartile					.020	(.020)					.018	(.021)
<i>x</i> (School)							.1825	(.045)	.1879	(.062)	.1653	(.055)
<i>J</i> (Type)							.0756	(.032)	.0798	(.056)	.0657	(.057)
<i>j</i> (Employment)							.3565	(.125)	.3874	(.148)	.3825	(.045)
<b>Sample Size</b>	3641		3641		3641		4162		4162		4162	
<b>Adjusted R<sup>2</sup></b>	.3151		.3108		.3149		.3196		.3204		.3303	

<sup>26</sup> Standard errors are presented in parenthesis. The model specifications include an individual's ethnic characteristics, marital status, accommodation details, number of dependent children under the age of 16 and the economic activity of other members of the household. Job characteristics have also been included such as union membership, whether the job is full time or part time, temporary or permanent, in the public or private sector and the size of the firm the individual is working in.

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