Returns to Education:
A Non-Technical Summary of CEE Work
and Policy Discussion [1]

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Introduction

The measurement of the individual returns to education, that is of the individual wage gain from investing in more education, has been the object of extensive theoretical and empirical research, both internationally and within the CEE.

This paper offers a non-technical and relatively brief policy summary of an extensive CEE research programme which has focused on the impact of educational qualifications on individual wages and on how these labour market returns have changed over time.
In particular, it summarises:
1. the most recent evidence on the relative value of different academic and vocational qualifications in the British labour market;
2. how this value differs for different subgroups, defined in particular by gender, ability and age at which the qualifications were obtained; and
3. how this value has changed over time.

In addition to discussing tables of key results on the above topics, we hint at the most important methodological issues involved in recovering the *causal* effect of the different qualifications on wages and correspondingly present results from more sophisticated estimation methods which have attempted to account for some of these issues. Throughout we also point at both ongoing and upcoming CEE research.

In the conclusions we discuss the potential policy implications of unexpectedly low returns and of wide differentials in the returns to different types of qualifications.

The most robust findings to date are that overall, returns to educational qualifications on the labour market are sizeable and significant. Considerable variation was however uncovered in the wage returns to different types of qualification, with academic qualifica-

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tions generally earning higher rewards. Furthermore, the returns to all qualifications have been found to have remained stable throughout the last decade for both men and women, the only exception being the disappearance of returns from very low grade GCSEs.

1. *The value of educational qualifications in the UK*

1.1 Recent evidence from cross-sectional data

Table 1 provides recent evidence on the relative value of different academic and vocational qualifications in the British labour market for full-time employed men and women. The individual wage premia from the different qualifications have been estimated from the 2001 Labour Force Survey, a quarterly survey of a representative sample of households in the UK.

In terms of interpretation, since the estimates are based on *all* the qualifications held by an individual[2], a reported coefficient represents the difference in (log) hourly wages between someone who holds that qualification and someone who does not, holding all other educational achievements and the control variables constant. The estimated returns are thus cumulative across qualifications, and can be summed to obtain the total returns to a combination of qualifications. So for instance, young men choosing an educational route consisting of 5 or more good GCSEs followed by at least two A-levels and ending with a first degree earn on average a 71% higher wage compared to men without qualifications.

The qualification yielding the highest returns for either males or females appears to be a professional qualification (43-49%)[3], followed by a first degree (27-28%) or 5 or more good GCSEs (23-27%). For both sexes, a higher degree yields wage premia comparable to those from 2 or more A-levels and even from 1 to 4 good GCSEs (around 15%).
It is interesting to note how the distinction often made in terms of number of achieved A-levels and good GCSEs seems to be indeed mirrored in the returns. For both genders, moving from only 1 to 2 or more A-levels, or from less than 5 to 5 or more good GCSEs actually doubles the premium (indeed triples it for A-levels and males).

Qualifications which on the other hand seem to fail to generate any wage premium for males or females are the academic A/S and poor GCSEs qualifications and, for vocational qualifications, RSA, BTEC, apprenticeship and most notably NVQ level 2 and below. The lower average earnings observed for those having NVQ qualifications level 2 and 1 clearly deserve further investigation, as it will be touched upon at various points in this summary.

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[2] The two exceptions are the two A level variables and the two GCSEs at grade C or above variables, in which case individuals are classified only in one of the two respective categories.
[3] Note that the professional qualification group is highly heterogeneous, making the 'average' return difficult to interpret.

Table 1: Returns to Detailed Qualifications – Full-Time Employees, 2001

Qualification	Level	Male			Female		
		coeff.	(std.err.)	return	coeff.	(std.err.)	return
higher degree	5	0.134	(0.015)**	14.3%	0.145	(0.019)**	15.6%
first degree	5	0.238	(0.010)**	26.9%	0.246	(0.010)**	27.9%
other HE	4	0.072	(0.026)**	7.5%	0.106	(0.022)**	11.2%
HE diploma	4	0.014	(0.021)	none	0.111	(0.016)**	11.7%
2+ A levels	3	0.154	(0.010)**	16.6%	0.138	(0.010)**	14.8%
1 A level	2 or 3	0.054	(0.014)**	5.5%	0.066	(0.013)**	6.8%
A/S levels	3	-0.007	(0.033)	none	*-0.049*	*(0.036)*	none
5+ GCSEs A*-C	2	0.243	(0.008)**	27.5%	0.209	(0.009)**	23.2%
1-4 GCSEs A*-C	1 or 2	0.138	(0.008)**	14.8%	0.106	(0.009)**	11.2%
GCSEs D-F	1	0.019	(0.011)	none	-0.016	(0.015)	none
professional qual.	5	0.358	(0.019)**	43.0%	0.401	(0.022)**	49.3%
teaching qual.	4	0.074	(0.017)**	7.7%	0.257	(0.013)**	29.3%
nursing qual.	4	0.084	(0.030)**	8.8%	0.164	(0.011)**	17.8%
RSA higher	2, 3, 4	*-0.062*	*(0.075)*	none	0.005	(0.029)	none
RSA lower	1	-0.068	(0.018)**	-6.6%	-0.002	(0.008)	none
C&G advan. craft	3	0.044	(0.009)**	4.5%	-0.038	(0.025)	none
C&G craft	2	0.066	(0.016)**	6.8%	0.046	(0.028)	none
C&G other	1	-0.039	(0.014)*	-3.8%	-0.083	(0.020)**	-8.0%
HND/HNC	4	0.131	(0.009)**	14.0%	0.089	(0.014)**	9.3%
ONC/OND	3	0.096	(0.010)**	10.1%	0.053	(0.014)**	5.4%
BTEC diploma	1, 2	0.034	(0.024)	none	0.015	(0.024)	none
NVQ 3-5	3, 4, 5	0.031	(0.011)**	3.1%	0.041	(0.011)**	4.2%
NVQ 2	2	-0.089	(0.012)**	-8.5%	-0.066	(0.010)**	-6.4%
NVQ1	1	-0.069	(0.019)**	-6.7%	-0.087	(0.022)**	-8.3%
other	1	0.058	(0.005)**	6.0%	0.060	(0.006)**	6.2%
apprenticeship		0.013	(0.024)	none	*-0.078*	*(0.045)*	none
Constant		-0.124	(0.034)**		0.233	(0.041)**	
Observations		28,675			18,100		
R-squared		0.40			0.42		

Notes: Labour Force Survey.
OLS regression, controlling for age and age^2, ethnicity, region, workplace size and public sector.
Heteroskedasticity-consistent standard errors in parentheses. ** significant at 1% level, * at 5% level.
Numbers *in italics* indicate estimates based on cell sizes of fewer than 100 observations.
Return is percent increase in wage from holding the corresponding qualification compared to not holding it, all things equal and is calculated as $100 \cdot (\exp(\text{coeff}) - 1)$. It is reported as 'none' if the corresponding coefficient is not significantly different from zero.

If no account is taken of the time invested to acquire each qualification, these results imply that the wage premium associated with academic qualifications at the intermediate levels 2 and 3 is typically higher than the premium associated with vocational qualifications at notionally the same NVQ level. CEE work undertaken to specifically analyse these earnings differentials between academic and vocational qualifications at each National Vocational Qualification level (Conlon, 2001) quantifies the 'academic' premium to be around 5% at level 1, rising by 5% at each successive level of qualification.

More precisely, the differential is found to be 8-10% at the lower levels (1 and 2), and slightly higher at 12-18% at the higher levels (3 and 4). Note that these results are for males only, and, in contrast to those in Table 1, pertain to the highest level of academic and vocational qualifications. While these academic premia are found to be quite robust (i.e. invariant with respect to both the data source – LFS and NCDS – or the method used), they do not take into account the differential time required to attain the academic and vocational qualifications at each level. Under some necessarily simplified assumptions on the time taken to complete vocational qualifications, calculations by Dearden, McIntosh, Myck and Vignoles (2002) show that the returns *per year* of study for vocational qualifications do move closer, on average, to those for academic qualifications.

As to returns to *combinations* of academic and vocational qualifications, Dearden, McIntosh, Myck and Vignoles (2002) have found that some routes through the education system yield a higher return for a particular qualification. O-levels, for example, receive their highest return when they are followed by vocational qualifications, and lose some of their value when individuals obtain further academic qualifications, such as A-levels and a degree.

1.2   Heterogeneity in returns

The discussion above has considered average returns across the overall population; considerable heterogeneity in the value of educational qualifications has however been found for different subgroups, defined in particular by gender, ability and age at which the qualifications were obtained and age at which the returns are measured.

With respect to academic qualifications, a gender gap in returns is found at level 4 (i.e. for diplomas in higher education and other HE qualifications below degree level), where women tend to earn a higher premium than men, and at level 2 (i.e. GCSEs grade C and above), where it is men who earn a higher premium.
On the vocational side, both men and women have their highest premium from a professional qualification; for lower level qualifications, men and women earn their highest premia from very different types of qualifications. In particular, men currently earn their highest premia from HNC/HNDs (14%) and ONC/ONDs (10%), while women from teaching (29%) and nursing (18%) qualifications.

Dearden, McIntosh, Myck and Vignoles (2002) exploit the NCDS to investigate whether the wage premium from qualifications varied according to the ability of the individual. While this was not found to be the case for academic qualifications, for vocational qualifications the return is approximately twice as high for individuals of low ability, highlighting how the vocational route could be of critical importance for the less able student.
An interesting related result is the one by Galindo-Rueda and Vignoles (2003); contrasting the NCDS 33-year-old cohort in 1991 to the later BCS 30-year-old cohort in 1999, they find that the returns to higher education (compared to graduation from high-school) have significantly increased for individuals with intermediate levels of ability.

Jenkins, Vignoles, Wolf and Galindo-Rueda (2002) look at the returns to adult learning in the UK, defined in their analysis as learning between the ages of 33 and 42 that results in a qualification. Although some specific types of lifelong learning do appear to boost the wages of the least qualified workers[4], lifelong learning was not overall found to lead to measurable increases in hourly wages. Stronger evidence of potential economic benefits from lifelong learning was however found in terms of employment outcomes. In particular, the acquisition of vocational qualifications later on in life was associated with a higher probability of having moved into the labour market by 2000 for men and women who were out of the labour market in 1991 and with a higher likelihood of remaining in work for women employed in 1991.

Finally, Galindo-Rueda and Vignoles (2003) exploit all the years available for the NCDS and BCS cohort to explore the existence of life-cycle effects. Focusing on males and the returns to a year of (post-compulsory) education, their findings point to rising returns over the life-cyle (from negative and no returns in the early twenties – arising from foregone experience and time to search for a good job match – to positive returns in the early thirties, which then seem to have stabilised up to the early forties).

1.3 Evidence from a cohort study

The large samples in the LFS coupled with information on very detailed levels of qualifications held by individuals, allow us to estimate the returns to a wider range of qualifications than is usually the case. Furthermore, the data contains information on all of the qualifications held by respondents, allowing us to include in our wage equations all the qualifications held by individuals and consider returns to different educational routes.

These important strengths of the LFS come however at the price that the results represent the percentage differences in wages between people with different educational qualifications
  (a) controlling for only basic individual information (age, ethnicity, region, workplace size and public sector) and
  (b) necessarily imposing some restrictions on the problem (e.g. OLS regression in general imposes homogeneous returns to all qualifications).

The numerous methodological difficulties associated with the measurement of returns to educational qualifications raise some doubts as to whether we have been uncovering causal relationships between education and wages in every instance. The extent to which the returns estimated from the LFS represent the true causal effect of education remains an issue to be explored in further CEE research, this applying in particular to the negative 'returns' found for NVQ level 2 and 1.

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[4] In particular, robust evidence was found that men who left school with only low-level qualifications but later acquired a degree via lifelong learning earned more than their peers who did not do any lifelong learning.

A diametrically different approach is taken in the CEE work by Blundell, Dearden and Sianesi (2003), who have exploited the rich background information of the NCDS to assess the importance of test score and family background information is generating reliable estimates (point (a) above) and to carefully explore a number of alternative techniques for recovering the *causal* impact of education on wages (point (b) above)). The price in this case was that the emphasis had necessarily to be placed on the returns to very broad levels of education, since sample sizes would not have allowed a methodologically thorough, robust and flexible examination of the causal impact of very disaggregated qualifications.

To illustrate some of their conclusions, Table 2 presents the estimated returns for males to undertaking some form of higher education or its vocational equivalent (i.e. level 4 and 5).[5]

Table 2: The returns to higher education compared to less-than higher education – NCDS Males, 1991

Average treatment effect (ATE), average effect of treatment on the treated (ATT) and average effect of treatment on the non-treated (ATNT)

		ATT	ATE	ATNT
OLS				
(i)	basic specification	39.8	39.8	39.8
		(37.1; 42.5)	(37.1; 42.5)	(37.1; 42.5)
(ii)	full specification	28.7	28.7	28.7
		(25.7; 31.8)	(25.7; 31.8)	(25.7; 31.8)
(iii)	fully interacted	26.5	30.8	31.8
		(22.8; 30.6)	(27.7; 34.4)	(28.5; 36.6)
MATCHING				
(iv)	basic specification	40.1	40.1	40.2
		(37.5; 43.1)	(37.5; 42.8)	(37.5; 42.8)
(v)	full specification	26.9	30.9	31.8
		(22.7; 30.8)	(27.8; 34.5)	(28.9; 36.5)

Notes:
ATT = average return to HE for those who undertook HE.
ATNT = average return to HE those who did not undertake HE would have enjoyed from undertaking it.
ATE = average return to HE in the population, irrespective of qualifications obtained.
Basic specification: ethnicity and region (and implicitly age and gender).
Full specification: plus standard parental background information, tests at 7 and 11, school variables.
Sample size 3,639, except for matching: ATE (3,414), ATT (1,019) and ATNT (2,395).
95% confidence intervals based on the heteroskedasticity-consistent standard errors for (i) and (ii); bootstrapped 95% bias-corrected percentile confidence intervals (500 repetitions) for (iii) and (iv).

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[5] HNC/ HND, SHNC/ SHND; TEC/ BEC or SCOTEC/ SCOTBEC higher or higher national certificate or diploma; professional qualification; nursing qualification including NNEB; polytechnic qualification; university certificate or diploma; first degree; post-graduate diploma; and higher degree. If someone has a vocational HE qualifications but not an A-level or equivalent level 3 qualification, their qualification was downgraded to A level or level 3 equivalent.

The results in the table highlight several important issues which are important when considering the simple estimates from the LFS presented in Table 1:

1) the returns to education are very sensitive to the inclusion of control variables *X*. In particular, controlling for ability test scores and family influences significantly reduces the returns by a factor of almost one third (compare (i) to (ii) or (iv) to (v)).

2) Simple OLS imposes that the returns to education do not vary according to individual characteristics *X*. By contrast matching does not restrict at all the way the returns depend on *X*. Matching can thus avoid misspecification bias (compare (ii) to (v)).

3) Once we allow OLS to model the heterogeneous returns in a completely flexible way by including *all* interactions between individual characteristics and the HE indicator, OLS estimates avoid misspecification bias and in fact are found to coincide with the matching ones (compare (iii) to (v)). Note however that to implement either estimation strategy, large sample sizes are required.

4) In contrast to OLS, matching forces the researcher to effectively compare only comparable individuals. This is particularly relevant for the interpretation and policy implications of the above finding that if those who have not continued to HE had instead undertaken it (ATNT), they would have enjoyed a substantially higher benefit than the group who has effectively gone on to HE (ATT). As can be easily checked (see Blundell, Dearden and Sianesi, 2003, for details), non-HE individuals and matched HE individuals are still far too different in terms of their observable characteristics. In particular, the matched HE individuals are on average still 'better' than the non-HE individuals, resulting in the average outcome for the matched HE group to be an overly optimistic representation of what the non-HE individuals would have earned had they gone on to HE.[6] The analyst needs to accept the fact that there simply is not enough information in the available data to achieve sufficiently close – and thus reliable – matches. Carefully performed matching can thus help to discriminate between more reliable results and those which should be viewed with particular caution. By contrast, with OLS this process may not be explicit, and the detailed OLS specification underlying the estimates in Table 1 may be hiding the possibility that one is not comparing the like with like (again this might be relevant in particular to individuals with NVQ2 and 1).

Careful methodological work along these lines has also been done on a more disaggregated level, estimating the incremental returns to three (sequential) educational qualifications both on average and by actual qualification achieved: completing O-levels or its vocational equivalent, completing A-levels or its vocational equivalent and undertaking some form of higher education.

The overall returns to educational qualifications at each stage of the educational process were found to remain sizeable and significant, even in the more general specifications. Compared to leaving school at 16 without qualifications, Blundell, Dearden and Sianesi (2003) find an average return to O-levels of around 18%, to A-levels of 24%, and to higher education of 48% (see their Table 4.3 for more details). An interesting result

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[6] Estimates of the ATNT would be upward biased also if individuals select into HE based on their individual unobserved returns from it (estimates of the ATT would by contrast remain unbiased).

from their disaggregated analyses concerns the returns to O-levels by educational group: at that stage, even if those who do acquire some qualification at 16 have the greatest returns from this initial investment, those who drop out at 16 without any qualifications would still have had a hefty average payoff of over 13% from obtaining O-levels or equivalent before leaving education.

Omitting ability and family indicators was found to severely bias the estimates of all the returns upwards (e.g. compared to no qualifications they found a bias of 43% for the returns to O-levels, of 29% for the returns to A-levels and of 24% for the returns to HE compared to no qualifications). Ignoring selection into education based on these generally unobserved characteristics as well as imposing homogeneous returns to educational qualifications was found to lead to an overall upward bias of between 17-30% in the various estimated returns.

1.4   Combining cross-sectional and cohort studies

The next stage of CEE research in this field is to further explore and then combine the two types of data to exploit their comparative strengths while overcoming their respective weaknesses. Further issues that deserve more methodologically sound study in the light of recent advancement in the literature are measurement error and (especially for women) selection into employment. The aim is to then derive some simple rule-of-thumb correction rules which will allow one to appropriately correct estimates derived from nationally representative cross-section data such as the Labour Force Survey (as in Table 1) to obtain a more reliable measure of the true causal impact of the different educational qualifications on individual earnings.

2.   Changing returns to educational qualifications over time

2.1   Evidence from cross-sectional data

LFS data for the years 1996 to 2001 has been exploited to gain a picture of how returns to the different qualifications have been changing in the cross section over the second half of the 1990s (for more details see McIntosh, 2002). Table 3 contains information as to how returns to the different qualifications have been changing over time for men and for women, where for parsimony only returns in 1996 and in 2001 are presented.

Remarkably, for both sexes there appears to have been virtually no change in the estimated returns to basically all qualifications over the time period considered, this conclusion applying also for all intermediate years (not shown). The only exception are low-grade GCSEs (grades D and below), the returns to which seem to have disappeared for both genders by 2001. Where once such low-level school-leaving qualifications were valued in the labour market (yielding a premium of 7-9% in 1996 and a statistically significant return up to 2000 for males and 1999 for females), it appears that more recently they confer very little if no benefit to their holders.

Table 3: The Returns to Detailed Qualifications – All Full-Time Employees

Qualification	MALES		FEMALES	
	1996	2001	1996	2001
higher degree	0.112	0.134	0.123	0.145
	(0.025)**	(0.015)**	(0.029)**	(0.019)**
first degree	0.221	0.238	0.234	0.246
	(0.014)**	(0.010)**	(0.016)**	(0.010)**
other HE	0.089	0.072	0.109	0.106
	(0.041)*	(0.026)**	(0.032)**	(0.022)**
HE diploma	0.077	0.014	0.147	0.111
	(0.025)**	(0.021)	(0.020)**	(0.016)**
2+ A levels	0.157	0.154	0.135	0.138
	(0.013)**	(0.010)**	(0.014)**	(0.010)**
1 A level	0.086	0.054	0.057	0.066
	(0.023)**	(0.014)**	(0.018)**	(0.013)**
A/S levels	*0.016*	-0.007	*-0.178*	*-0.049*
	(0.085)	(0.033)	*(0.048)***	*(0.036)*
5+ GCSEs A*-C	0.269	0.243	0.232	0.209
	(0.011)**	(0.008)**	(0.013)**	(0.009)**
1-4 GCSEs A*-C	0.162	0.138	0.149	0.106
	(0.010)**	(0.008)**	(0.012)**	(0.009)**
GCSEs D-F	0.087	0.019	0.066	-0.016
	(0.014)**	(0.011)	(0.020)**	(0.015)
professional qual.	0.318	0.358	0.359	0.401
	(0.022)**	(0.019)**	(0.031)**	(0.022)**
teaching qual.	0.046	0.074	0.267	0.257
	(0.024)	(0.017)**	(0.018)**	(0.013)**
nursing qual.	0.056	0.084	0.154	0.164
	(0.037)	(0.030)**	(0.015)**	(0.011)**
RSA higher	*0.044*	*-0.062*	0.011	0.005
	(0.161)	*(0.075)*	(0.034)	(0.029)
RSA lower	-0.074	-0.068	0.029	-0.002
	(0.030)*	(0.018)**	(0.010)**	(0.008)
C&G advan. craft	0.043	0.044	*-0.065*	-0.038
	(0.014)**	(0.009)**	*(0.038)*	(0.025)
C&G craft	0.002	0.066	0.045	0.046
	(0.016)	(0.016)**	(0.036)	(0.028)
C&G other	0.040	-0.039	-0.066	-0.083
	(0.013)**	(0.014)*	(0.018)**	(0.020)**
HND/HNC	0.131	0.131	0.063	0.089
	(0.014)**	(0.009)**	(0.019)**	(0.014)**
ONC/OND	0.107	0.096	0.110	0.053
	(0.013)**	(0.010)**	(0.021)**	(0.014)**
BTEC diploma	0.081	0.034	0.060	0.015
	(0.027)**	(0.024)	(0.030)*	(0.024)
NVQ 3-5	0.027	0.031	0.009	0.041
	(0.027)	(0.011)**	(0.027)	(0.011)**
NVQ 2	-0.065	-0.089	-0.086	-0.066
	(0.022)**	(0.012)**	(0.020)**	(0.010)**
NVQ1	*-0.130*	-0.069	*-0.062*	-0.087
	*(0.040)***	(0.019)**	*(0.044)*	(0.022)**
other	0.043	0.058	0.035	0.060
	(0.007)**	(0.005)**	(0.009)**	(0.006)**
apprenticeship	-0.010	0.013	*-0.072*	*-0.078*
	(0.027)	(0.024)	*(0.069)*	*(0.045)*
Observations	16483	28675	9828	18100
R-squared	0.41	0.40	0.43	0.42

Notes: Labour Force Survey. Heteroskedasticity-consistent standard errors in parentheses. ** significant at 1% level, * at 5% level. Numbers in italics indicate estimates based on cell sizes of fewer than 100 observations.
Control variables are age and age^2, ethnicity, region, workplace size and public sector.

2.2   Evidence from two cohort studies

As discussed in Section 1.3, estimates from the LFS may suffer from various sources of bias. To assess the robustness to omitted variable bias of the above findings as to changes in returns, we again turn to the cohort studies. In particular we compare the returns enjoyed in 1991 by individuals aged 33 (the NCDS cohort) to the corresponding returns enjoyed in 1999/2000 by individuals aged 30 (the BCS cohort).

Note that compared to the analysis in Section 1.3, it is more difficult to come up with the 'best' point estimates, since the need for comparability between the two data sources forces us to make sub-optimal choices in each of the two datasets. It has also to be pointed out that this comparison will conflate the time effect (what we are after) with the effect of being born in a given year (cohort effect). Also, the available data is not ideal in that the two cohorts are observed only at *around* the same age. The 3-year gap between the two cohorts might be problematic in the presence of growing returns to education over the life-cycle (cf. Galindo-Rueda and Vignoles, 2003). For women, this age difference in the early thirties would raise further serious issues, considering how the age at first birth has been increasing and fertility declining between the two cohorts. In addition, women born in 1958 compared to 1970 had a quite different outlook as to future labour market participation. Concerns about selection into employment are further compounded for women by the issue of differential choices between part- *versus* full-time work. For all these reasons, interpreting changes in returns between the two cohorts for women observed in work is an extremely complex exercise. These issues are high on CEE research agenda, but until explored in more detail, in the following we do not report results for women.

Table 4 focuses on the highest qualification achieved and, controlling for detailed family background and early ability information, shows the wage returns to employed men to four broad types of qualifications, both relative to no qualifications at all ('total return') and relative to the previous educational level ('incremental return').

Table 4: The Returns to Broad Types of Qualifications: NCDS in 1991, BCS in 1999/2000 and change in returns from 1991 to 1999/2000 – Males

	Total return			Incremental return		
	NCDS '91	BCS '99	'91–'99	NCDS '91	BCS '99	'91–'99
CSE/equiv.	0.152**	0.011	-0.141**	0.152**	0.011	-0.141**
	(0.032)	(0.030)	(0.044)	(0.032)	(0.030)	(0.044)
O-lev/equiv.	0.217**	0.091**	-0.126**	0.065**	0.079**	0.013
	(0.029)	(0.026)	(0.039)	(0.022)	(0.022)	(0.032)
A-lev/equiv.	0.282**	0.194**	-0.088*	0.065**	0.103**	0.039
	(0.031)	(0.028)	(0.042)	(0.018)	(0.018)	(0.026)
HE/equiv.	0.457**	0.344**	-0.113**	0.175**	0.150**	-0.025
	(0.031)	(0.028)	(0.041)	(0.019)	(0.018)	(0.027)
Obs.	3,709	4,150	7,859	3,709	4,150	7,859
R^2	0.26	0.21	0.24	0.26	0.21	0.24

Notes: Heteroskedasticity-consistent standard errors in parentheses, ** significant at 1%, * at 5%, $^\nabla$ at 10%. OLS regressions controlling for ethnicity, region, family background, and ability at 10 (BCS) and 11 (NCDS).

The main finding is of a dramatic fall in the returns at the very bottom of the educational scale.[7] The 16% wage premium these low qualifications used to earn compared to no qualifications in 1991 has dwindled to a statistically insignificant 1% in 1999/2000.

For 30-year old males, between 1991 and 1999/2000 the returns to the other three broad types of qualifications compared to no qualifications have also dropped considerably, O-levels/equivalents and higher education by 11-12 percentage points and A-levels/equivalents by 8 percentage points, with all of these declines being statistically significant.

The right-hand side of Table 4 however reveals how these large declines seem to be largely due to the dramatic loss of labour market reward of the lowest qualifications. If we consider the *incremental* return from achieving O-levels compared to these low qualifications, or of then moving to A-levels from O-levels, or to higher education from A-levels, these marginal premia have remained stable across the two cohorts and time periods. Quite reassuringly, this evidence is qualitatively very much in line with the one from the LFS discussed in Section 2.1 (note that the returns in Table 3 are comparable to the incremental returns rather than to the total returns in Table 4).

If we did not have access to the rich ability and family background information available in the two cohort datasets, would the inference about the change in returns lead to different conclusions? Analyses performed to assess whether possibly differential ability bias may impact on these conclusions are quite reassuring.[8] Although not controlling for important individual characteristics would consistently lead the analyst to overestimate the fall in the returns – both 'total' and 'incremental' – at all levels, the main message remains unchanged: a large decline in the total returns to all the four levels of qualifications, which seems largely driven by the fall in the returns to the lowest type of qualification.

3.   Conclusions and policy discussion

Overall, education seems to be a profitable investment for individuals, although large variation has been found in the observed wage returns by type of qualification. In particular, academic qualifications still seem to be attracting more substantial rewards on the labour market.

Despite the growth in the numbers of students obtaining qualifications, and in particular higher level academic qualifications, the returns to all qualifications have remained stable throughout the period from 1996 to 2001 for both men and women, the only exception being the disappearance of returns from very low-grade GCSEs.

Given the wide – and persisting – differential in returns from different educational investments, one may be led to conclude that individuals are not choosing their educa-

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[7] The CSE/equiv. category includes CSEs levels 2-5, GCSEs/O-levels D-E and their equivalents including level 1 vocational awards.

[8] Details available upon request.

tional paths optimally[9], or that policy reforms are needed to address qualifications with very low if not absent returns.

We have however highlighted a whole set of methodological caveats as to the interpretation of the LFS estimates to different qualifications; since selection is not controlled for, it cannot be ruled out that individuals choosing e.g. academic qualifications are more able and inherently more productive, on average, than those who choose their vocational equivalent. Another reason for caution in drawing policy implications as to which type of qualification to encourage, is that most estimates obtained so far at most represent – in the absence of selection or other types of biases – the average return for those acquiring that qualification. If as it is both likely and borne out by the data (see Sections 1.2 and 1.3), returns vary between individuals, these estimates will not necessarily be indicative of the return individuals who did not take that qualification would have earned, on average, had they undertaken it.

In addition to these methodological and interpretational caveats, a number of considerations further apply on the cost and benefit side, both from the point of view of the individual and of society.

On the individual cost side:

- As highlighted in Section 1.1, the estimates take no account of the actual amount of time spent to achieve the different qualifications. Comparisons should however more appropriately be performed on an annualised basis, i.e. in terms of returns per year rather than on overall returns. While such an annualisation is reasonably straightforward for academic qualifications (generally studied on a full-time and uninterrupted basis), for their vocational counterparts quite arbitrary assumptions need to be made.

- Individual costs to obtaining a qualifications also include the psychic costs of studying and the effort needed to achieve the qualification; these might also considerably differ between qualifications and thus contribute to explain differential returns.

On the individual benefit side:

- It should be noted that the returns in Tables 1 and 3 are net of subsequent educational participation, thus not allowing for the following two channels of additional returns. First, undertaking a given qualification may be a prerequisite or make it more likely for the individual to undertake another one; this additional return should more appropriately be part of the causal impact of taking the first qualification. Similarly, undertaking a qualification may enhance the wage return to a further qualification.

- In terms of individual wage benefits, an additional issue concerns the question of whether these different types of educational investment have similar degrees of risk. The returns we have estimated represent average returns. If there are differential levels of uncertainty concerning the nature and labour market relevance of the skills

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[9] Market failures in the form of credit constraints, risk aversion especially for poorer households, myopia, and lack of information for young individuals may prevent them from being fully aware of the benefits and/or able to follow their optimising incentives.

acquired through the different qualifications, it is possible for the average returns to incorporate these differential risk premia.

- Different courses and qualifications are most likely to entail different amounts of consumption benefits.

- Different qualifications may provide a different combination of wage and non-financial returns. The latter include e.g. benefits in terms of employment probability over the working life and higher non-employment compensation in the form of fringe benefits, more leisure, or lower stress and demands on the worker.

  In these two latter cases the individual would be prepared to accept a lower monetary return than if only wage benefits were considered.[10]

From the social perspective:

- On the cost side, different courses may entail quite diverse full direct costs.

- On the benefit side, different qualifications may have different social returns in terms of spill-over and external impacts.

- Related to the above, the increase in individual productivity due to the acquisition of different types of qualifications may be differentially captured by the individual through wages as opposed to the firm through direct measures of productivity and firm profitability. This could arise from:

  (a) a differential degree of generality of the skills conferred by the different qualifications. Standard economic theory typically distinguishes human capital according to its portability between jobs, firms or sectors. When the acquired skill has a large job-, firm- or sector-specific component (i.e. it has little or no use outside the job, firm or sector) or, more generally, when labour mobility is effectively restricted, firms gain monopsony power, which allows them to avoid passing the full productivity gain on to the employee in terms of higher wages.

  (b) a differential degree of monopsony power enjoyed by the firms into which individuals with different qualifications select (as hypothesised by Conlon, 2001). Even independently of the generality of the skills acquired, different types of qualifications might lead to employment in firms with different degrees of monopsony power. For example, if it were the case that vocational qualifications tend to lead to employment in firms with a higher degree of monopsony power than do academic qualifications (possibly but not exclusively because the skills acquired through the vocational path are – or are perceived to be – of a more specific and hence less portable type), this could contribute to account for the lower degree to which the premium to vocational skills is reflected in wages.

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[10] A recent US analysis by Carneiro, Hansen and Heckman (2003) explicitly incorporating non-pecuniary benefits and uncertainty in the standard economic model of college choice does in fact find a substantial non-pecuniary return to college. They also find that it is variability in these non-monetary factors (psychic gains from learning and from working in the skilled occupation net of psychic costs) rather than in financial returns which plays a dominant role in schooling choices. More in general, they show how important it is to account for non-pecuniary benefits when evaluating educational choices: of the high school graduates, 96% do not regret not having gone to college (measured in utils), but 85% regret this decision financially.

- A long-standing debate in the economics of education literature concerns the extent to which education is a signal of existing productivity (signalling or screening hypothesis) as opposed to enhancing productivity (human capital hypothesis).[11] It could well be that the differential returns to different types of qualifications arise not only due to a different mix with which the qualifications confer actual skills and signal pre-existing skills, but also due to a different type of signal itself. In particular, individuals acquiring a vocational qualification may be *perceived* by employers as less able or motivated than their counterparts investing in an academic qualification. A related concern raised by Conlon (2001) is that while the national administration and common assessment method of academic qualifications gives prospective employers a clear signal about individuals' skills, the local administration and differing assessment methods of vocational qualifications may make these type of qualifications an imprecise and hence risky signal for employers to base their hiring decisions on, which could cause the vocationally trained to pay a risk premium in the form of a lower wage.

Finally note that while all these issues apply at a given point in time, differential returns are likely to be affected also by current labour market conditions and will thus not be stable over time. In particular, the differential premia to different qualifications will reflect the current relative supply and demand of individuals with these differing human capital attributes and will do so in a way which depends on the relative substitutability of these different types of human capital.

All these considerations apply in particular to the results obtained for NVQ level 1 and 2 qualifications, for which further research is high on the agenda. The negative returns estimated for these qualifications are a clear indication that the available estimates do not properly correct for the potentially lower average ability or motivation of those individuals acquiring NVQ1 and NVQ2 (see also the discussion in McIntosh, 2002, concerning the measurement of NVQs as the highest qualification in the LFS). A related argument is that these qualifications could be perceived by employers as sending out a negative signal about the individuals who have acquired them.

In general several factors might explain the particularly low or even absent return to a given type of qualification, in addition to the policy-relevant suggestion that the skills acquired are not tailored to the requirements of firms and the labour market. It could for instance be that this type of qualification fundamentally represents remedial learning for low-quality achievement in compulsory education. Or the qualification, say NVQ2, might only have value when it leads on to another qualification (complementarities in returns). In this case it could also be that someone stopping at this level might be sending out a signal of lower motivation.
Next there are some specific issues with NVQ2. In particular, these qualifications are often viewed more as a way to certify existing skills, rather than as equipping individuals with new skills and hence increased productivity. If NVQ2 were mostly taken when already in employment to demonstrate competence in a specific job, one would not ex-

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[11] An interesting background is provided by Galindo-Rueda (2003), who finds that British employers initially rely on information from educational qualifications to discriminate between employees but then progressively learn about their workers' true ability.

pect a significant wage return to acquiring them. By contrast given the increased visibility and hence portability of the certified skills, this qualification might benefit individuals in terms of subsequent employment probability. This was in fact confirmed by Dearden, McIntosh, Myck and Vignoles (2000), who found that NVQ qualifications at both levels 1 and 2 have statistically significant positive effects on the probability of employment for women, as well as in the study on adult learning by Jenkins, Vignoles, Wolf and Galindo-Rueda (2002) (cf. Section 1.2).

The highly disaggregated results discussed in this summary represent the outcome of quite an innovative and valuable exercise. However, as is the case for good research, answering some questions raises new ones and thus opens new research avenues. The issues and caveats discussed in this concluding section represent high research priorities for ongoing and future CEE work, as well as for government-sponsored evaluation work.

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