**Returns to higher education – some doubts and alternative views**

This is the text of a presentation from the HEPI seminar on higher education returns, 20 June 2012. Supporting evidence for the views expressed is provided with endnote and reference sections.

1. The difficulties in calculating the returns to higher education are well documented, and will be familiar to most of us, yet, it seems to me, the resulting uncertainties are not always given due prominence, even in academic papers, and in wider discussions the figures tend to be taken as a given with no questions asked. Do these difficulties materially affect the estimates of the returns to higher education? Many researchers think not, though, it seems to me, this comforting consensus comes more from the imperative to carry on calculating, rather than from any really convincing evidence.
2. Different questions need different estimates, and while some statistics look very difficult to derive, some look impossible – they can be no more than guesswork. I will start with the merely very difficult, related to student choice, before throwing in some of the extra problems we face with policy assessment. Finally I’ll make some suggestions as to what should be done if these somewhat sceptical views are accepted.

**Student choice**

Whether to study 1

1. From the prospective-student’s point of view, is going to university a good financial investment? Advice from Government is reassuring.

*Why go to university?*

“Universities transform lives - the typical graduate earns £31,000 a year as against £19,000 a year for a non-graduate. “ David Willetts

“on average, graduates tend to earn substantially more than people with A-levels who did not go to university. Projected over a working lifetime, the difference is something like £100,000” – Directgov

1. These statistics, quoted by the Minister and on the Government information web site, do not tell us what someone would earn had they decided differently, which is what the prospective student needs to know. Also, note that the real decision is whether or not to **start** a higher education course, which does not necessarily result in gaining a qualification. Most estimates of the returns to higher education refer to the returns to graduates. Given that on average the labour market outcomes of those who drop out are poor, in fact probably worse than those who do not enter at all, this necessarily presents a rosy picture of higher education.
2. Many studies try to compare those who could enter HE, but don’t, with those that do. But how similar are theses two groups? With data matching we can get a fairly accurate picture2. The figures I will show here refer to the following population:
* Students at English state schools and colleges
* At least two A-levels or equivalents
* At key stage 5 in 2008

This population is divided into those who enter a higher education course at a UK HEI or English FEC within two years, and those who don’t.

Note that participation at universities outside the UK is not recognised. I have excluded independent school pupils because significant numbers go on to study abroad.

1. **Figure 1: Qualification profiles**
2. Here are the qualification profiles for those who go on to higher education and those who don’t. The blue columns show the distribution of qualifications for those who go into higher education, the red for those who don’t. Remember we are talking here just about those with at least the equivalent of two A-levels
3. The first thing to notice is that the International Baccalaureate is irrelevant. Though much talked about, very few students take it. Apart from that, the profiles of the HE entrants and non-entrants are very different. They are not comparable groups.
4. Let’s look in detail at those with three A-levels.

**Figure 2: Profile of tariff points for those with 3 A-levels**

1. This shows that even for those with at least three A-levels, when we look at the grades, HE entrants and non-entrants are quite different.
2. As well as differences in qualifications and grades, entrants and non-entrants will also differ in the subjects they take. Many of the estimates do not allow for any of these differences, and the few that do, do so in a simplified way, which does not fully capture the consequences for future earnings3.
3. If you want to look at a time series, or even just get an up-to-date estimate, or if you want a large enough sample size to look at sub-groups, you will be unlikely to find a survey with the data to control for A-level grades or many of the other variables known to be important. As a result sources with only basic information, like the Labour Force Survey, are often used. The justification for this is that the basic data leads to upward and downward biases. While this will be the case to some extent, the idea that we can be confident that they cancel each other out does not stand up to scrutiny 4.
4. Those special studies that provide the richest most detailed datasets are not free from problems. Often, particularly for longitudinal surveys, there is a risk of response bias. And all studies suffer from two fundamental difficulties.
5. Firstly, those who don’t go to university will differ from those who do, simply with respect of this decision. There are techniques which purport to get over this by reproducing the kind of comparison that we can get from random sampling, but in practice there are no data which would allow us to use these techniques with confidence 5.
6. Going to university is a long term investment, which leads me to the second fundamental difficulty. We really would like know the **lifetime** earnings of those who are thinking about going to university. Someone aged 65 in 2012 will most likely have gone to university in 1965. Does his earnings tell us much about what future students will earn at that age?

What to study6

1. For those going to university, there are decisions about what and where to study. Estimates of the returns from studying specific subjects have shown large subject differences. A recent studies by Professor Ian Walker using the Labour Force Survey found that Law, Economics and Management Sciences had the highest lifetime returns for men. Why should so many students choose subjects with much lower returns? The suggestion from Professor Walker is that,

‘They’d rather have the fun now and pay for it, in terms of lower wages, in the future.’

But just how secure are the results? And is this the only explanation for students’ decisions? Consider these differentials for men and women.

**Table 1: Earning differential for male and female graduates compared to non-graduates with 2+ A-levels**

|  |  |
| --- | --- |
| Men | 22% |
| Women | 36% |
| Women – Men | 14% |

*Derived from data presented in Walker and Zhub (2011), ‘Differences by degree’*

1. We see that the differentials for women are higher than for men, despite the fact that women graduates, on average, earn less than men. These estimates were calculated by comparing men with men and women with women. This is easy to do because the source, the Labour Force Survey, identifies the sex of all the respondents. But what would happen if we did not know whether non-graduates were male or female?

**Table 2: Earning differentials for male and female graduates compared to ALL non-graduates with 2+ A-levels**

|  |  |
| --- | --- |
|  Men | 43% |
| Women | 15% |
| Women – Men | -28% |

*Derived from data presented in Walker and Zhub (2011), ‘Differences by degree’*

1. In calculating these figures the male graduate earnings and the female graduate earnings were both compared to ALL those with just two A-levels, that is with both the males and females combined. The picture is now completely reversed; men get more from higher education. This is a deliberately spurious result - which the authors would never produce - but it shows what can go wrong when we assume that the non-entrants are all the same. And this is just what **was** done to compare the returns for studying different subjects. Each graduate subject group was compared to all the non-graduates taken together.
2. It would be very difficult to identify those would did not go to university but, had they done, would have taken a particular subject. We can get partly round the problem by using richer datasets that enable us to control a whole range of variables. Fortunately we have a new series of surveys that can help us with this, at least for earnings three and a half years after graduation. Using these data Arnaud Chevalier found that the top earners were medics and dentists – no surprise there, and in the silver medal position comes . . . economics! No surprise to the economists. But, when the comparison is made on a like for like basis, controlling for personal characteristics, background, A-level points, and so on, economics slips down to ninth place, behind accounting, IT, engineering and even education. So perhaps the country does not need more economists after all.
3. More seriously, this demonstrates just how unreliable estimates of returns can be when made without a good range of control variables. And we cannot assume even this improved data has got us close to the right answer. Students do not select their subjects at random, and determinants of the choice of subject are themselves potential determinants of future earnings. The discussion in the literature about this mostly focuses on a single unchanging factor called ‘ability’, whereas we know that there are many different abilities, as well as different interests and different values, which change through time. These abilities, interests and values all potentially affect both subject choice and earnings. It is unsurprising that accountancy graduates are often found to be high earners; accountancy is an obvious choice for those who put great store by financial rewards. No doubt if there were an MSc course in tax avoidance there would be high returns and plenty of takers, but it would not be for everyone.
4. Using like for like comparisons, earnings vary more within subjects than between subjects*,* so those students who study subjects they like and are good at, as well as having a good time at university, may also be making the best choices in terms of long term financial rewards, even if their subject choice is not reported to have a high average earnings.

Where to study7

1. Will you earn more if you attend a prestigious university? A simple question, that is hard to answer. Unless we make do with earnings just six months after graduation, there are no data sets big enough to give an answer for individual universities. The information we have relates to the ‘mission groups’ of universities, or to the returns to graduating from a university with a given so called ‘quality’ measure, like those used in league tables.
2. We do now have the series of surveys of graduate earnings three and a half years after graduation which I mentioned before, but even with these data we face some difficulties. There are very few comparable students attending institutions at both ends of the league tables, so that the only safe comparisons are between students at reasonably similar universities. The ‘quality’ measures are always highly correlated with entry qualifications, so there is a high risk the ‘quality’ measure will pick up some unmeasured aspect of entry qualifications. And while, in general terms, entrants are sorted by their entry qualifications, there is still scope for the ambitious and confident to apply to more selective universities, and it may be that these unmeasured attributes lead to higher earnings. There have been some ingenious attempts to minimise these estimation problems, and the evidence does seem to show that there is at least an initial earnings premium from attending more selective universities. However, we still do not know why going to a ‘top’ university has this payoff, nor do we know whether the differentials change over the course of a working lifetime.
3. Do employers use university ratings to select recruits? The evidence is mixed but it is likely that popular employers recruiting for fast track positions are far from ‘university blind’. They do not have an obligation to promote social mobility and if they can reduce their recruitment costs by using university reputation as a first sieve, they will. So graduates from prestige institutions will be at an advantage compared to those of equal ability and potential from other institutions.

 Mis-selling

1. Despite all these difficulties, crude return estimates are regularly used as a sales pitch to advise prospective students about the benefits of higher education in general and particular courses and universities in particular. They almost never hear about the students who drop out, the uncertainties in estimating the returns for those who have graduated, nor are they warned that ‘past performance is not necessarily indicative of future results’.
2. Government policy sees students’ choice as driving up quality. The idea seems to be that valuable courses, those which give the highest returns to students, will be the most attractive and will be able to expand and charge higher fees. This approach is built on the idea that prospective student can be provided with reliable information. In fact, what is provided looks like mis-selling.

**Policy development -**

1. So far I have looked at the information to inform students whether, what and where to study. We were only concerned with the returns to individual students. We were not concerned whether these were merely positional gains, putting some individuals ahead of others in the search for a good job. However, such distinctions are crucial for policy questions like:-
* How many places should be funded,
* What share of costs should paid out of the public purse?
* Should students be subsidised to take certain subjects

Social returns8

*Productivity versus sorting*

1. If, to take an extreme scenario, higher education, had no effect on productivity, and all the graduate differentials resulted simply from the students getting into good jobs, the only possible benefit to society in general would be through any resulting improvement in the selection process.
2. This scenario seems unlikely when considering the returns for higher education as a whole, but it quite possible that any differential returns between universities with different levels of prestige are due to the graduates from prestigious universities being favoured in job selection.
3. Over the decades there have been many ingenious attempts to separate these different explanations for the returns to education in general, and higher education in particular, but a recent review of the attempts to isolate the productivity effect concluded that,

 ‘the extent to which education acts as a sorting device in addition to (or instead of) augmenting productivity, is still unknown’

1. I would add that the efficiency of the sorting is also unknown. It is often assumed that if the use of qualifications to sort job applicants persists, it must be helping to find the best candidate. But the people making appointments may not really be in a position to judge whether their system is working, even when they think that they know. Once established, selection criteria can become embedded permanent features, requiring no confirming up-to-date evidence for their continued use.

*Impact on others*

1. Yet another problem arises when we appreciate that the effects of higher education on productivity may reach beyond the individual graduate. The graduate may affect the productivity of other individuals, including non-graduates, in the workplace, the family, the neighbourhood, and so on.

*Who is affected?*

1. Many policy initiatives will only impact on a sub-group of students or potential students. For example, suppose we are concerned that an increase in fees could reduce demand and we want to estimate the impact on earnings. Consider the student with good A-levels who wants to be, say, a doctor, dentist or teacher? For all but the most extreme fee increases she will go to university anyway. She has no choice. So to identify the impact of the change we have to indentify the group that are potentially affected – not easy in itself.

From estimates to policy positions

1. Despite all these uncertainties, estimates of the returns to higher education, often very crude estimates, are variously used to argue about how many places should be funded, what fees should be charged, and whether ‘laboratory subjects’ should continue to receive funding. According to some, what we need is more lawyers, economists and accountants, not more scientists, technologists, engineers and mathematicians! Oh, and since the returns for women are higher than for men, perhaps they should be charged higher fees, except that that would be illegal!

**The cost of student loans**9

1. There is at least one very important policy related question which, in most respects, is simpler than those considered so far. How much will the new student loans scheme cost the Government? This involves estimating loan take up, voluntary repayment rates, and the number former students going AWOL, but there is no need to identify those who could have gone to university but did not and are otherwise just like those who did.
2. The Government’s cost estimates assume that earnings in the past are a good guide to what will happen in the future. And the estimates have to be right far into the future. We have estimated that for the first students entering in 2012, 40 to 42 per cent of the net present value of their repayments will be collected from 2032.
3. While not everybody believes, as I do, that the official cost estimates look optimistic, everyone agrees they are uncertain, so everyone agrees that they **could** turn out to be optimistic. So what will happen should the repayments fail to come in as projected?
4. Previously we thought that the tab would ultimately be picked up by future taxpayers. But there is another possibility. In applying for a loan each student has to sign up to the following condition:-

*The catch*

‘You must agree to repay your loan in line with the **regulations that apply at the time the repayments are due** and as they are amended.’

This makes it easy for this, or any future Government, to change the conditions. Need to get the costs down? Freeze the earnings threshold, increase the interest rate, there are plenty of options. The legislation which makes such changes possible is not new, but the scale of the loans and the lengthy repayment periods make such changes more likely.

1. I argued that prospective students were being mis-sold higher education with uncertain financial returns. It seems that the reassurances about the repayment scheme are also suspect.

**What should be done?**

1. There are no magic algorithms and sets of data that could give us the certainty we would like. We should not pretend we have answers, even when clever people have done the calculations, using advanced techniques and what would once have been inconceivable computer power.
2. The situation is worse than it need be so long as we make believe that reliable estimates can be made.
3. It would be helpful if those making estimates could:-
* Set out all the assumptions.
* Give range estimates based on different assumptions and scenarios.
* Describe the estimation in sufficient detail so that others can replicate it.
* Provide data extracts and intermediate datasets.

Most academic papers do set out the assumptions made, though not always fully. Often different approaches are used, reflecting different assumptions, but we don’t always get these synthesised into and overall range estimate. With the miracle of the internet it should be possible to record the details of data extraction and computation completely, along with the datasets created, but this is not normally done.

1. For the pundits, politicians and policy makers:-

When advising prospective students:-

* Be circumspect.

In policy discussions:-

* Do not treat what are uncertain estimates as hard facts.

I am not naive enough to believe these strictures will be widely adopted, but I make them all the same.

1. A final point. My remarks about mis-selling and the uncertainties in the return estimates might be taken as arguments to discourage students from applying to universities. This is not my intention. For the young person who wants a career that requires higher education I would say, go on, if you can, don’t hesitate. For the person who wants to study a subject that interests them, go on, if you can, don’t hesitate. But for anyone who has no real enthusiasm for higher education, they should not trust the claims for the financial returns. Going to university simply to earn more is not a good reason to spend the time and money that that entails.

**Endnotes**

**(1) Governmental and Ministerial Statistics and Non-qualifiers**

Governmental and Ministerial Statistics

1. David Willetts, the Minister for Universities and Science, at first used average graduate and non-graduate earnings to justify to the increase in fees (Willetts, 2011).

“Universities transform lives - the typical graduate earns £31,000 a year as against £19,000 a year for a non-graduate. That is why it is right to expect graduates, not students of course, to pay back if they are in a well-paid job.”

Also note the incorrect restriction of debt liability to ‘graduates when, in fact, it applies to all students who take out loans. Since then, the same statistics have been used to argue that ‘on average’ going to university is a ‘very good deal’ for students (Willetts, 2012).

1. The Department for Business, Innovation and Skills provided the following explanation of the source of these figures.

“The annual earnings figures quoted by Mr Willetts on Radio 4 – i.e. of £31,000 for graduates and £19,000 for non-graduates - are 'raw' average earnings figures, and will have come from the Labour Force Survey. Whilst we cannot identify precisely how they were defined (eg. which quarter of the LFS, UK or England, mean or median) they are almost certainly average earnings for all of working age from a fairly recent quarter of the LFS for those with a highest qualification at Level 4 or above (L4+) and for those with a highest qualification at Level 3 (L3) or below. For example, we know from internal analysis that as at Quarter 2 (Apr-Jun) 2011, for employees in England, full and part-time combined, the mean earnings were £32,500 for those with L4+, and £18,500 for those with L3 and below.”

1. Under ‘Why go to university or college? ‘ Direct Gov states,

“And on average, graduates tend to earn substantially more than people with A levels who did not go to university. Projected over a working lifetime, the difference is something like £100,000 before tax at today’s valuation.”

1. The Department for Business, Innovation and Skills provided the following explanation of the source of this figure.

“The lifetime earnings advantage of around £100,000 for graduates over non -graduates (often referred to as the 'graduate premium') comes from various studies over recent years. All of these have used Labour Force Survey Data (albeit for different time periods) and have used similar - though not identical - methods.

Basically they estimate the returns to having a first degree as opposed to stopping your education with 2 or more A-levels (i.e. the comparison group are those who, in principle, could have gone to university, but didn't). These returns are then used to estimate the lifetime earnings (over the working life) in net present value terms for those with a degree and for those with 2+ A-levels as their highest qualifications. The "around £100,000" is the difference. So it estimates the earnings advantage that arises due to the qualification (in this case, a degree). It is an average for all graduates, and most of the studies actually calculate it net of tax. Several of the studies also attempt to account for some of the costs - principally foregone earnings - to some extent.

Inevitably each study provides a different estimate, which is why we don't generally cite a single figure, but most of them have consistently found a graduate premium of over £100,000. The most recent BIS report on this was that published in the BIS research series in June 2011.” (This BIS research is referenced at Colon G and Patrignani P, 2011.)

Non-qualifiers

1. 17.4 per cent of home full-time first degree 2009-10 entrants to UK higher education institutions are projected never to graduate, and 14.0 per cent are projected to never gain any HE qualification (HESA, 2012). There are no equivalent figures for part-time entrants, but 74 per cent of home part-time first degree 1996-97 entrants to UK higher education institutions still had not graduated after 11 years (HEFCE, 2009).
2. Non-completion, therefore, needs to be factored in when weighing the pros and cons of going to university. However getting former students to respond to questionnaires is not easy, and when they have not qualified it is even more difficult. A study seeking to record the experiences of ‘drop outs’ after leaving, only achieved a 10 per cent response rate (Davies et al, 2003). It seems likely that the responders would, on average, have had better outcomes than the non-responders, but they were still much less successful on average than those who went on to graduate. Follow up telephone interviews provided illustrative details behind both successful and unsuccessfully outcomes, with some early leavers having no regrets, while others thought that dropping out had been ‘like a big black mark’ over them.
3. Some general longitudinal sources enable non-completers to be identified, and the National Child Development Study (NCDS) of children born in 1958 has been used to estimate the returns on earnings at aged 33 (Blundell, et al, 2000). After taking into account a wide range of factors, including family background and A-level grades, it was found that men who dropped out had average earnings 12.9 per cent lower than those with at least one A-level who did not go into higher education. The numbers identified were small, and the uncertainty correspondingly large (standard deviation 5.0 per cent). For women, there was no significant difference between the earnings of those who left early and the non-entrants.
4. Thus our knowledge of the labour market outcomes of those who do not complete is very limited, but that should not mean that we give the impression that non-qualifiers do not exist. The move from calculating returns on ‘years of education’ to returns on specific qualifications is an improvement, but by effectively ignoring non-completion it does bias the returns to higher education upwards, and this should be more widely acknowledged. In the longer term it may be possible a fuller picture of the outcomes after dropping out if the data protection issues in using information on loan repayments can be resolved.

**(2) Qualification and grade profiles of students with two or more A-levels or their equivalents**

1. The data used to create figures 1 and 2 are shown in Appendix 1. These data were first created by HEFCE in their analysis supporting the introduction of the new student control arrangements in 2012-13. These data were made available by HEFCE on request from HEPI, with the agreement of the Department for Education.
2. The sources are the National Pupil Database (NPD), HESA (UK HEIs) and ILR (English FECs). These were linked using HEFCE’s data matching. The HEFCE data provides a breakdown of the 2008 Key Stage 5 cohort of individuals by qualifications obtained, school type and the proportion who participated in higher education within two years of qualification (typically at the age of 18 or 19). For students with more than three A-levels the highest three grades were selected, without any deduplication of awards in similar subjects.
3. Entering higher education was defined as:-
4. Starting a course at leading to an HE qualification or credit(s) of any level. No minimum period of study.
5. Full-time and part-time courses.
6. All HE study reported through the ILR or HESA returns. This excludes registrations for courses:-
* at all institutions outside the UK;
* at further education colleges outside England
* at private institutions apart from the University of Buckingham
1. In addition, for those achieving three A-levels, data were prepared combining the 2004 to 2008 Key Stage 5 cohort each being linked to HE records for the following two years. These data were not used in the analysis presented here but are included in Appendix 1.
2. The counts of students in Appendix 1 are all rounded to the nearest five.
3. The selection of students with ‘two A-levels and their equivalents were made by excluding the following rows:-
* One A-level – all grades
* Tariff - AAB+ and not AAB+
* BTEC National Diploma - other
* BTEC National Awards – all grades

Tariff was calculated using UCAS tables. [www.ucas.com/students/ucas\_tariff/tarifftables/](http://www.ucas.com/students/ucas_tariff/tarifftables/)

**(3) A-level subjects and grades, and earnings**

1. A-levels provide a public measure of ambitions and abilities so they can have an impact on earnings through the signal they provide to employers, as well as through any productivity gains the attributes that successful A-level candidates bring. Still widely seen as the ‘gold standard’, they are used by employers even when recruiting graduates. (For some anecdotal evidence, see Hawes, 2008.)
2. Despite this, few studies include any measure of the qualifications and grades of A-levels and their equivalents. An analysis of National Child Development Study (NCDS) of children born in 1958 was used to estimate the returns on earnings at aged 33 (Blundell, et al, 2000), and A-level score, along with an ability test score at 16, were added to the model specification after the inclusion of a wide range of family background and demographic variables, maths and ability scores at aged 7, and so on. A level score was significant and with the ability test score at 16 had the effect of reducing the returns to a first degree from 17.1 to 12.2 per cent for men and from 36.7 to 33.7 per cent for women. The comparator group were individuals with at least one A-level, lower than the usual two A-level cut off, but ‘equivalent’ qualifications do not seem to have been included. (A-level equivalent qualifications are identified in the NCDS data but the comparator group for this study is described only in terms of A-levels.) The specification assumed a linear effect with A-level points, which may not have fully captured their impact. No account was taken of A-level subject, though researchers using the same NCDS data set (along with a further analysis using a dataset of graduates and diplomats from 1980) found a ‘large positive return on mathematics A-level, even after controlling for previous ability and further study at the graduate and postgraduate level’ , (Dolton, et al, 2002). The effect of introducing A-level subjects into the model of earnings is to reduce the return for a first degree for males from 12.2 per cent in the earlier study (Blundell, et al 2000) to 6.9 per cent, which was not significantly different from zero. This analysis is working at the limits of the data and it would be unwise to draw hard conclusions, but it does demonstrate that without data that would enable A-levels and their equivalents to be fully specified, the return estimates are likely to be biased.
3. Datasets of graduates’ earnings cannot provide estimates of absolute returns to higher education, but they can be used to estimate the relative returns for different subjects. The Longitudinal Destination of Leavers from Higher Education (LDLHE) which has a rich set of variables. (For more about LDLHE see Endnote 6.) These data have been used (Chevalier, 2011) to estimate the relative returns of different subjects. The introduction of A-level points, after already controlling for the local labour market, demographics and family background is significant. It can be illustrated by comparing economics with education. The mean A-level score for economics students was 24, for education 15.

**Table 3: Earnings for education graduates compared to economics graduates with and without controlling for A-level points.**

|  |  |
| --- | --- |
| Without A-level points (spec 3) | 97.1% |
| With A-level points (spec 4) | 101.4% |

Source: Chevalier, 2011, table 2. Calculated by: Exp(education – economics).

**(4) Can limited data provide acceptable estimates?**

1. Datasets with rich information, like the NCDS, which are not repeated at regular intervals, do not allow researchers to look at the trends in the returns to higher education, or even get a single up-to-date estimate. Also the sample size makes it difficult to mine down to sub-groups, like particular qualifications or subjects. For these reasons, sources like the Labour Force Survey (LFS) are often used.
2. We have seen that the usual comparator group, those with at least two A-levels or their equivalents who do not go on to higher education, have a different qualification and grade profile from those who do. The LFS does not have data to capture these differences. The A-level equivalent qualifications are not even defined in the LFS; it is left to the respondents to decide. Further, it is not possible, or at least it is very difficult, to distinguish between those who have never gone to university and those who left without a qualification. The LFS has little information on the social background of individuals, which are known to be associated with both entry to higher education and to earnings.
3. It would seem unlikely that such a source could provide useful measures of returns. Here we look some of the justifications that have been made for the use of the LFS to estimate the returns from higher education qualifications compared to those with two or more A-levels or their equivalents.

London Economics

1. The Department for Business Innovation and Skills (BIS) recently commissioned London Economics to carry out a study into the returns to higher education qualifications. (Conlon, et al, 2011). They used LFS data. Their justification is succinct; their approach had been ‘used widely in the academic literature’. There is no direct pointer to which academic literature they are referring to, but there is just one reference to a study estimating the returns to higher education. This is the 2005 paper by O'Leary and Sloane.

O’Leary and Stoane

1. The O’Leary and Stoane paper uses the LFS. They supplement these data which an estimate of the ‘quality’ of the subjects taught at HE level derived from admissions data. This measure gives all students studying the same subject the same ‘ability’. No doubt mindful of such limitations the authors write, ‘this does not control for all types of endogeneity, but earlier studies suggest that biases introduced through failure to control for endogeneity tend to cancel one another out, so that OLS estimates are reasonably reliable.’ They refer to Bonjour (Bonjour et al, 2005) and Card (Card, 1999) as ‘instances’ of such studies.
2. The Bonjour study is based on a sample of 214 pairs of identical female twins, more than half of whom had the same education level and so would not contribute to the within pair comparisons. Such a small sample leads to very wide confidence intervals. It is also vulnerable to outliers and, indeed, this has recently been shown to be the case (Amin, 2011). Using twin comparisons does not ensure that ‘all types of endogeniety’ are controlled for, and though in this study there were also data on ability test scores, there is no certainty that these remove any remaining bias. The two biases which cancelled out were: unobserved differences in what is usually called ‘ability’ and measurement error in reported qualifications. The first was investigated by looking at within twin differences and controlling with additional variables, the second by asking each twin to report on qualifications achieved by the other. Where these reports differ, clearly one must be wrong, but short of carrying out a follow up audit we cannot be sure which, if any, is right. By making a number of assumptions, the researchers produced estimates of the returns by using both self and other twin reports. It was these estimates that led to the conclusion that the biases cancelled out. However, we cannot be certain that these estimates which attempt to allow for misreporting are any better than those based on assuming that the self reported qualifications were accurate. Even if we were to accept the treatment of measurement error in this study, it would not necessarily apply to the estimates by O’Leary and Stone. Though the twin study used information on reported qualifications, these were converted into assumed years of education and the returns were ‘per year of education’. This statistic will be sensitive to lower level qualifications which we might expect to be reported with lower accuracy.
3. The Card reference is to a review rather than a particular study, based mostly on US studies, and is of limited relevance to the studies we are concerned with. Even leaving that aside, the cancelling out claim is not justified by the conclusion of this review that misreporting effects ‘**partially** offset the presumably positive biases’ of unmeasured ability (emphasis added).

Walker and Zhub

1. The recent Walker and Zhub study (Walker et al, 2011) was referred to in the discussion of the returns for studying different subjects. (See tables 1 and 2.) They judge that the bias in their estimate of the returns overall are likely to be small given their choice of ‘control group’, that is those whose highest qualification are two or more A-levels or the equivalents. In support of this they cite the results by Blundell (Blundell et al 2005). (NB they also, in addition, discuss the possible biases in their estimates of subject specific returns; these are not considered here.)
2. This 2005 paper uses the same NCDS data as the earlier study discussed above (Blundell et al, 2000). It is wider in scope than the earlier paper, estimating the returns to different qualification levels, and exploring different methodological approaches. Crucially, the estimates of returns to higher education do not include A-level points.
3. The closest statistic available to the comparisons in the Walker paper are between those with an HE qualification in total, which includes those with post graduate qualifications, and those with at least one A-level or equivalent. For this comparison introducing variables unavailable from the LFS like test results and family background reduces the OLS based returns for men from 28.9 to 23.5 per cent. The equivalent figures for a typical comparison in the Walker paper, between those with at least two A-levels or equivalent and a first degree, would show a smaller reduction, but since the A-level points are not included as a control variable, the size of this reduction does not indicate a lack of bias in the LFS estimates. A better estimate of the bias would come from the 2000 study (Blundell et al, 2000) which showed that for men the return from a first degree compared to one A-level was 18.4 per cent with a LFS data type of specification and 12.2 per cent with a full set of control variables including A-level points.
4. It should also be remembered that the NCDS data relates to individuals born in 1958 who typically would have entered higher education in 1974. We cannot draw hard conclusions from this cohort in deciding what the bias resulting from missing variables would be for those entering decades later. See below for further discussion of the changes that have taken place.

Review by the Centre for the Economics of Education (CEE)

1. The view that the LFS or similar data is good enough make unbiased estimates is not new and a review of the returns to higher education published by the CEE (Chevalier, 2002) concluded that, ‘the general consensus appears to be that OLS estimates provide acceptable estimates of the returns to qualifications.’ On the face of it this makes no sense, the plausibility of any estimates would depend on the data that was used. From the context it appears that what the authors meant was that OLS estimates using data with limited information like the LFS. In support of their conclusion the authors cite work by Dearden (Deardon, 1999). This paper also uses the NCDS data. Reported educational outcomes in 1981 and 1991 are used to give ‘ball park figures’ on the extent of measurement error, and the effect on return estimates is calculated. The effect of the bias resulting from part of the population not being in the workforce is also explored. The conclusion is that measurement error and compositional bias offset unobserved ‘ability’ and family background variables. The estimates of measurement error depend on a number of assumptions; so the estimates of measurement error are themselves uncertain. Further work using the same data source concluded that ‘ignoring both ability and misreporting biases would lead to strongly upward-biased estimates of returns’. The author suggests a rule of thumb to allow for this (Battistin E, 2012). In the particular case of the returns to a first degree it would be unwise either to accept Dearden’s conclusions or Battistin’s rule of thumb because neither allow for A-level grades.

Changes in education since the NCDS cohort entered higher education

1. The NCDS is a valuable resource, and it is natural that it has been extensively mined to reveal insights about education in general and higher education in particular. We have seen how it has been used to see to what extent factors missing from analysis based on more limited data may cancel out. Where those assessments do not include any control for A-level grades, it seems likely that the effect of missing measures of ‘ability’ will be underestimated, but there is also a more general concern about using this source to come to conclusions about the fitness of the LFS to estimate returns for more recent cohorts. Since the NCDS cohort entered HE, typically in 1976, not only has the HE participation rate more than doubled, the proportion of subsequent cohorts achieving a range of qualifications has increased, along with the average age leaving full time education (Devereux et al, 2011). In comparing those with degrees to those with two or more A-levels we are looking at a much larger proportion of the population. The relative growth of these groups is also potentially important when considering the differences between these two groups. Figure 3 shows the ratio of those achieving a first degree with those achieving at least two A-levels or their equivalent.
2. We can see that the growth in the proportion of those achieving at least a first degree (they may also have postgraduate qualifications) is greater than the growth in those with at least two A-levels or their equivalent (they may also have a higher education qualification). This could be driven by an increase in those following a non-traditional route to a degree courses without A-levels or their equivalent, from the conversion of many HND courses to degree programmes, and from an increase in the proportion of those with A-levels going on to higher education. All of these have the potential to alter the differences between graduates and the usual comparator group, those with at least two A-levels but no higher education qualifications. We should not assume, therefore, that results based on the 1958 cohort are necessarily relevant to those born twenty years later.

 **Figure 3: % first degree to % with 2+ A-levels by year of birth**

Figure 3 note Data kindly provided by Professor Devereux taken from figures 3 and 4 of his 2011 paper (Devereux et al, 2011).

**(5) Allowing for unobserved variables**

1. In principle the same kind of comparison that is made by random sampling can be achieved through the use of instrumental variables. For such variables to be valid they must correlated with the predictive variable, in this case a measure of education, but uncorrelated with the outcome, in this case earnings, conditional on all the other covariates. The second conditions cannot be established with certainty, and it therefore only makes sense to attempt IV estimation when the nature of the IV is such that it can be expected to have this property, like, for example, when a regulation or the law is changed giving a sudden change in education which is clearly independent of the choices made by individuals. For example, in the UK the raising of the school leaving age from 15 to 16 has been extensively used as an IV. Even where the IV is valid, the values calculated will relate to those affected by the change, so for example, those students who would have continued at school beyond 15, even without the change in the law, would not be included in the estimate based on the raising of the school leaving age.
2. In the UK, there are no obvious candidates to support an IV estimation of the returns to higher education, but recently there has been an attempt to find the returns per year of full-time education, including higher education, using the rapid expansion that took place between 1989 and 1994 when higher education participation more than doubled (Devereux et al, 2011). The idea is that the change in funding and student number controls, and the changes in the examination system led to changes in education levels unrelated unobserved factors causing student to go on to higher education. Because the proportions leaving school after 16 and the proportions gaining A-levels also grew, the change was not confined to one small section of the population, though those would have gone on to higher education prior to the expansion would not be included in the estimate. The most troubling part of this estimation is that we have to assume that an extrapolation of earnings from before the expansion will show us what would have happened had the expansion not taken place. The need for this assumption brings some uncertainty to the results, especially as the first ‘expansion’ graduates came into the labour market just as the economy came out of recession, and the cohorts that followed came into a rapidly changing labour market.

**(6) Returns by subject**

1. The values in tables 1 and 2 were calculated from values in table 2 of ‘Differences by degree’,(Walker et al, 2011). The differentials were calculated as:-

 exp(‘first degree’ – ‘2+ A-level’) -1.

Note that the figures in the text of the paper we calculated as:

‘first degree’ – ‘2+ A-level’

Reasons for student choice of subject

1. The explanation in terms of student impatience is from Walker, (Walker, 2011). Davies (Davies et al, 2012) provides a useful review of the evidence of the motivations of students in choosing subjects, as well as reporting further analysis. This shows the complexity of the choice and how the criteria differ for different individuals, reflecting their different interests and values. Overall of the six motivations they put to students ‘opportunity to make a positive contribution to society/environment’ was the most frequently selected as ‘very important’ in their choice of which subject to study (32 per cent) , whilst ‘salary’ was judged very important be the least (18 per cent). The relative importance of salary differed for different groups, being more important for males than females for example.

Using the Longitudinal Destination of Leavers from Higher Education (LDLHE) to determine relative returns by subject

1. If the estimation is limited to the relative returns between subjects, then graduate surveys can be used. In recent years a much richer and complete data set has become available through a follow up survey to the Destination of Leavers from Higher Education, the Longitudinal Destination of Leavers from Higher Education (LDLHE). This is a follow up survey carried out about three and a half years after students qualify from UK higher education institutions. It covers all institutions and is linked to both the DLHE, carried out about six months after qualifying, and the HESA student record. This provides a wealth of accurate data, giving the potential to control for a wide range of factors as well as assessing the impact of response bias. In November 2006 the first DLHE was carried out following up the leavers from 2002-03. It has been repeated every other year with the fourth survey planned for November 2012. As the student data has improved, so the data available for LDLHE has improved, though with a delay. Additional data obtained through linking with pupil data, including full details of prior qualifications, will become available for the 2014 LDLHE. While these data are superior to what has been available hitherto, it should be appreciated that in providing information on higher education qualifiers three and a half years after qualifying, we still do not have an estimate of lifetime earnings. Also those who leave without qualifications are not surveyed.
2. The first LDLHE of 2002-03 leavers was analysis by Chevalier (Chevalier, 2011). He showed that graduates in economics had the second highest returns measured with no controls (table 2, specification 1) and the ninth highest return with his preferred model (table 2, specification 6). This study also shows that within subject differences were larger than between subject differences.
3. It is likely that at least part of the remaining differences in earnings in the full specification were due to unobserved characteristics of the individuals who chose one subject rather than another. The reasons students give for entering HE and for choosing a subject suggest this is the case. Table 4 shows some results from a large scale survey (Purcell et al, 2008).

**Table 4: Evidence for the selection of subject by unobserved variables related to earnings.**

|  |  |  |
| --- | --- | --- |
|  | Career orientated | Learning orientated |
| A-level grades | Low | High | Low | High |
| Subject | Education | Law | Creative Arts | History, Philosophy | Linguistics, Classics |
| Entered HE to ‘to get a good job’  | 85% | 83% | 70% | 73% | 77% |
| Chose subject because ‘enjoyed studying it’ | 56% | 60% | 90% | 92% | 93% |
| Earnings rank (Chevalier model spec 6)  | 5 | 10 | 20 | 21 | 22 |

1. The three subjects ranked lowest out of the 22 none ‘mixed’ subjects all have relatively high proportions of students choosing the subject because they liked it, and relatively low proportions going into HE ‘to get a good job’. ‘Getting a good job’ is a poor proxy for what we really need, that is ‘getting a high salary’, but it is the nearest we have in this survey. Education and law are shown for comparison as subjects attracting career orientated students. It seems likely that on average students who score ‘getting a good job’ will be more likely to invest time and energy in their job search and efforts to get promoted.

**(7) Returns by institution**

Fuelling the Mission Group lobbyists

1. The private returns by institution are both very difficult to calculate and of great interest to both policy makers and lobbyists.
2. If the estimation is limited to the relative returns between institutions, then graduate surveys can be used. In ‘Does it pay to attend a prestigious university?’ (Chevalier et al, 2003) made use of graduate cohort studies for leavers in 1985, 1990 and 1995. The estimation is difficult because the student recruitment at different universities is highly differentiated, so that in practice there are no, or very few, comparable students attending institutions with different levels of prestige. This is fully recognised by the authors. In order to reduce the risk of the bias that could result from using regression techniques, they employ propensity score matching. This technique makes the difficulty of finding similar students at institutions with different levels of prestige fully visible. And, as the authors put it, the ‘common support’ in comparing ‘Modern’ and ‘Russell Group’ universities was ‘thin’. For many of their comparisons the number of control students accounting for 50 per cent of the matches are in single figures. It is therefore not surprising that the estimates of the Russell group premium over Modern universities is wide, between 1 and 6 per cent. Given that A-level achievement was only represented by A-level points, rather than by actual grades and subjects, this premium might easily disappear with a fuller characterisation.
3. The paper was widely reported, almost always without the caveats. It has been referred to repeatedly by the Russell group since its publication. In the Russell group version of the results, Russell Group graduates receive a 10 per cent wage boost over a lifetime. (See for example, Piate 2010 and 2012.) In fact the data underlying the analysis related to earnings 3, 6 and 11 years after graduation. Where did the 10 per cent figure come from? It may be from the least squares regression for three years after graduation. The same technique shows no significant premium 6 and 11 years after graduation. More importantly, as the authors pointed out, results from this technique are likely to be biased, hence in their summary they reported their results as ‘up to 6 per cent’.
4. The report was used both to justify the introduction of ‘top-up’ fees in 2006, and to criticise the decision to cap fees at £3000. (Thompson, 2003). Curiously, the figures used to discuss top-up fees, were not based on the analysis, but a simple assumption about what the premium in lifetime earnings might be, backed by a credibility check based on looking at the US market.

Institutional ‘quality’

1. The 1985, 1990 and 1995 leaving cohorts used by Chevalier, along with a data set of 1999 leavers, were analysed using various measures of institutional quality rather than membership of a mission group as a way of distinguishing institutions (Hussain et al, 2009). There was no explanation of what would constitute ‘quality’ and the measures used followed those found in most league tables without any justification. One of these measures, ‘total tariff’ scores, is highly correlated with all the other measures apart from ‘mean faculty salary’.
2. The lack of common support identified by Chevalier is not visible because only regression is used. The risk that the ‘quality measures’ will pick up unmeasured individual differences in prior qualifications is increased by grouping A-level point scores into three values. Even though the quality measure will be the same for all individuals in the same institution, this is not reflected in the error structure used. Significant returns to institutional quality are found, and these are concentrated in highest quartile of institutions, ranked by institutional quality. Given the weaknesses in the analysis these results cannot be taken as secure. This is in part acknowledged by the authors who look to the availability of better data sets in future.

Analysis using the Longitudinal Destination of Leavers from Higher Education

1. In recent years a much richer and complete data set has become available through the Longitudinal Destination of Leavers from Higher Education (LDLHE). (See Endnote 6 for more details.)
2. Chevalier used the first LDLHE, looking at a selection of 2002-03 first degree graduates. ‘Quality’ was measured with the league table figures published by the Guardian. Various model specifications were used, and the overall conclusion was that the returns to HE ‘quality’ were about 6 per cent and concentrated in the highest quality quartile (Chevalier, 2010).
3. The most recent estimation of the returns by institution took data from the second LDLHE survey and used a different approach (Broecke, 2012). Institutions were described by the grades (measured by the average UCAS tariff) of their entrants. This was referred to as the ‘selectivity’ of the institution rather than its ‘quality’ which, though an improvement in the terminology, is not completely accurate. In principle at least, a university could have entrants with higher grades than another even if it set lower entry levels. The LDLHE data was not only linked to the HESA student data but also the UCAS application records. This enabled comparisons to be restricted to students who had firm and insurance places at the same pairs of institutions. This novel approach addresses the problem of common support as well providing some control of factors associated with both university choice and earnings which would otherwise be unmeasured. There are still a number of limitations to the estimation, which are documented by the author; in particular that the tariff score is not a perfect measure of prior attainment.
4. The methodology leads to an estimate of the return to attending a selective institution which is broadly consistent with the earlier estimates of the returns to ‘quality’. However, there is an important difference. As noted, the earlier work found that the returns were concentrated at the top of the distribution, whereas this later work found that there are considerable returns in, say, attending an institution in the third rather than bottom quartile. It is not clear why the results should differ in this way. It could be the result of the different methodologies, but there are also differences in the effective samples and variables used. The later study only included those students who entered in 2002-03 and then graduated in 2004-05, therefore taking no more than three years study. Further 61 per cent of the selected observations were in parings where all students went to the same institution and therefore could not contribute to the identification of the institutional effects. Other differences, like the use of the tariff score rather than A-level points, may also have an effect. A systematic exploration of these differences would be useful.
5. It should be remembered that both of the LDLHE estimates are made for returns to the early part of graduates careers, and it remains an open question whether an institutional premium ‘wears off over time’. A related question, whether the differences are due to differences in productivity gains at university, or whether they reflect the signal that graduation from a ‘good’ or ‘top’ university send to employers, remain unresolved.

Do employers use university prestige in the recruitment of graduates?

1. A recent survey found that most employers did not see the type of university as being very important (Branine 2008), while the authors of the ‘Global Auction’ (Brown et al, 2011) are clear that companies ‘artificially limit the pool of talent by targeting elite universities.’ These apparently contradictory conclusions can be reconciled. For most employers, looking for good graduates, often with skills and potential in short supply, the costs of a wide search to find talent are justified. However, the most popular graduate employers, many in the financial sector, are swamped by applications. They can reduce their recruitment costs by discouraging applicants from all but the most prestigious universities. They accept that equally talented individuals will be studying at other universities, but they cannot justify the costs of identifying them.
2. In practice their will be a continuum between the extremes described with varying use of university prestige as a screening device. It is unclear how many graduate jobs are affected.

**(8) Signalling**

1. For the review of the effects of signalling, see Page, 2010.

**(9) Student loans**

Cost of loans

1. The estimates of the proportion of NPV to be paid from year 16 can be found at an addendum to the HEPI review of the Government’s proposals (Thompson et al, 2010).

Changing loan conditions

1. See Student Finance England (2011) for loan conditions. The likelihood of the loan conditions being changed is discussed in a report for the Intergenerational Foundation (McGettigan, 2012).

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