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Do UK Higher Education Students Overestimate Their Starting Salary?*

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Abstract

The wage expectations of university students have relevance for human capital theory, models of student enrolment, and public policy on the provision of higher education. However, these expectations have been the subject of relatively little research in European countries, with no contemporary evidence available in the UK. There has also been little consideration in the literature thus far of how much estimates may be biased by non-response and sample selection. This paper thus makes an original contribution to the literature by comparing UK undergraduate students' wage expectations with the actual wages earned by the same cohort on graduation, after attempting to correct for the aforementioned statistical issues in terms of observable characteristics. In contrast to other European studies, I conclude that, on average, full-time students overestimate their starting salary. Yet I also find substantial variation in the extent of overestimation between different subgroups.

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I. Introduction

Whether to enter higher education is one of the most important decisions that young people make. Although this is a costly investment, in terms of both time and money, it can also offer great financial (and non-financial) rewards. It is therefore vital that young people understand the costs and benefits of the different pathways available, so they can make well-informed educational decisions. Yet there has been growing unease in the UK about the quality of information, advice and guidance that teenagers receive[1] and that young people may not fully understand the prospects they will have upon entry into the youth labour market. I consider this issue during the course of this paper, focusing on whether UK undergraduate students can accurately predict their starting salary.[2]

This work is closely related to the classic literature on human capital investment,[3] which suggests that higher education will help to improve a young person's knowledge and skills. This will, in turn, boost their productivity in the world of work and, consequently, lead to an increase in future income. An extensive literature on the private returns to higher education has demonstrated these large financial gains.[4] Focusing on results for the UK, Walker and Zhu (2008) confirm that there are sizeable returns to an undergraduate degree (around 22 per cent for men and 35 per cent for women), while the government often states that graduates here earn, on average, £100,000 more over their lifetime than if they entered the labour force upon finishing their A levels.[5] Yet there is also evidence that the financial benefit of higher education varies by both subject and institution. Walker and Zhu (2010) show that men completing a Law, Economics or Management degree receive some of the greatest financial gains, while O'Leary and Sloane (2005) highlight the low returns for Art compared with other disciplines. Chevalier and Conlon (2003) illustrate that there is a 6 per cent premium for studying at one of the UK's prestigious 'Russell Group' institutions. It is therefore essential that young adults are fully informed of such differences, and that those who choose to enter higher education understand that their future wage will depend on the subject they study and the institution they attend.

[1]Department for Children, Schools and Families, 2009; Cabinet Office, 2009.

[2]In this paper, I explore the wage expectations of university undergraduates only (i.e. those who have already made the decision to participate in higher education). There are, to my knowledge, no data available in the UK on the wage expectations of young people who do decide not to enter university. Such individuals may also under- or over-estimate labour market wages, which may or may not be influential in their decision regarding higher education. Further data are required before such issues can be considered.

[3]Becker, 1964.

[4]See, for example, Card (1994 and 1995), Harmon and Walker (1995) and Walker and Zhu (2008).

[5]Department for Business, Innovation and Skills, 2008.

Yet the high net returns described above may start to diminish as higher education becomes more expensive. From 2012, the cap on tuition fees in the UK is set to triple to a maximum of £9,000 per annum. As a result, many expect there to soon be a 'market-based' higher education system, where the costs (as well as the benefits) of university vary between different courses and providers. Many policymakers believe that this will bring more efficiency to the sector. A fundamental rule of economics, however, is that such markets are only efficient when those purchasing the product are well informed. With respect to higher education, this means that varying fees and market-based provision will only work well (and ensure the efficient allocation of resources) if young adults have a reasonable understanding of what their degree will cost, their likely pay upon graduation and what they would otherwise earn under possible alternative choices (for example, what their pay would be if they entered the labour market straight from school). It is therefore vital that, in making such important decisions, young adults are well informed about the costs and benefits of higher education and the economic value of different degrees. But are young adults capable of making such rational assessments of the future, and do they hold enough information to make such financially complex decisions?

Only rather limited evidence on this topic is available in any European country, with most examples focusing on very specific groups outside of the UK. Wolter (2000), for instance, collected a convenience sample of 137 Swiss Economics students and suggests that their views of the future are actually quite accurate. Wolter and Zbinden (2002) come to a similar conclusion after drawing a small convenience sample of Swiss university students (two-thirds of which studied Economics) from two elite institutions. On the other hand, Brunello, Lucifora and Winter-Ebmer (2004) find that higher education students studying Business and Economics tend to 'over-estimate the university wage premium'.[6] Meanwhile, Webbink and Hartog (2004), the only current European study to consider a broad range of students, boldly entitle their paper 'Can students predict starting salaries? Yes!'. Yet these studies (having taken place in other European countries) provide rather little guidance for higher education policy in the UK. This paper therefore makes a timely and original contribution to the literature by considering whether British university students can, on average, accurately predict their first salary after graduation. Moreover, most of the existing literature has largely ignored the difficulty of comparing expected and actual wages due to the problem of non-response and sample selectivity. I also thoroughly discuss these issues during the course of this paper, before

[6]In a working paper version (Brunello et al., 2001), the same authors do analyse some information from students in other disciplines. They note, however, that around two-thirds of their sample comes from Economics or Business related fields.

attempting to correct my estimates for this problem (although I am only able to do so in terms of students' observable characteristics).

My results suggest that full-time undergraduate students in the UK overestimate their starting salary by, on average, £2,400 (roughly 15 per cent). Yet there are differences between subgroups of the student population. For instance, I find that those who have just entered higher education overestimate their first wage by £3,000, compared with £1,800 for those who are about to graduate. Similarly, Maths students overestimate their starting salary by an average of £1,300, compared with roughly £2,500 for those enrolled in an Art, Social Science or Humanities course. This last result does depend, however, on the type of institution the student attends. In particular, I find that overestimation of future wages is greatest (on average) amongst Science, Social Science and Business students who are enrolled in *modern* (post-1992) institutions.[7]

What, then, do such results imply for higher education policy in the UK? One might argue that the overestimation of future wages that I find is not necessarily a problem. For instance, it may be that those with high wage expectations also have high reservation wages, and therefore take more time and effort looking for a 'graduate' job. In this situation, it may be that higher expectations lead to higher wages and a better match between employer and employee. In a similar manner, work from other disciplines[8] and in a related economics literature[9] has suggested that high expectations may motivate students to work harder in their studies and thus raise their educational and occupational attainment. If either of the above holds true, it may not be optimal for policymakers to try to alter students' inaccurate beliefs. On the other hand, if higher education decisions (whether to go to university, what to study and where) are based upon inaccurate expectations of the future, then there may be a case for the government to intervene. Overly ambitious expectations in this instance might suggest that young people find it difficult to value different educational options, which could lead to them making inappropriate human capital investment decisions.[10] The government may

[7]One common way to classify higher education providers in the UK, and one that I use in this paper, is to divide universities into two broad groups: post-1992 and pre-1992 institutions. The former gained their university status in or after 1992 and are generally not research intensive. They also tend to admit, on average, students with lower university entry scores (i.e. lower A-level grades). The pre-1992 institutions gained their university status before 1992, are generally more research intensive and tend to admit students with higher levels of academic attainment. In this paper, I also refer to post-1992 universities as 'modern' and pre-1992 ones as 'old'.

[8]See Morgan (2005).

[9]See Brown, Ortiz-Nuñez and Taylor (2011).

[10]Of course, finding excessive wage expectations may just be an indication that young people are generally too optimistic. To conclude definitively whether young adults are mis-valuing their educational options, one would also need students' views of outcomes under the counterfactual (for example, what they would expect to earn if they chose not to enter higher education). Such detail is unfortunately not contained in any current UK data set.

therefore try to assist young people more in valuing these alternatives, perhaps by providing more labour market information.

This paper proceeds as follows. I begin in Section II by discussing the three data sources that I use, one that collects information on university undergraduates' wage expectations and the other two on recent graduates' employment outcomes. In Section III, I discuss the difficulties of sample selection and salary non-response. Students' expectations are then compared with actual graduate wages in Section IV, before a discussion of what the findings imply for higher education policy in Section V.

II. Data

One reason why more research has not been done in this area is the lack of available data on wage expectations. The UK 2004–05 Student Income and Expenditure Survey (SIES) is a recent data source that addresses this issue. This survey was carried out using face-to-face interviews between January and March 2005 by the Institute of Employment Studies and the National Centre for Social Research on behalf of the then Department for Education and Skills. The purpose of the study was to generate a representative sample of all higher education students in England and Wales, in order to investigate income and expenditure patterns. Over 3,000 students were interviewed from around 70 universities. The survey allows a detailed investigation across both universities and subjects within England and Wales.

A complex sampling design was used to ensure that a representative cross-section of students were selected. A sample of 80 universities from a population of 132 was drawn, with probability proportional to size, and 69 institutions took part.[11] Students were then randomly selected and sent an initial 'opt-in' questionnaire, where they were asked to provide some basic contact information.[12] Of the 7,458 questionnaires returned, 5,810 (78 per cent) gave consent to take part in the research. The survey organisers then excluded a number of students who were ineligible for the study (postgraduates, foreign students, those studying for a second degree). The final sample size achieved was 3,548, with 2,659 (75 per cent) interviews with full-time students.

[11]There was also stratification by region and whether it was a 'pre-1992' or 'post-1992' university, reflecting the quality of the institution. In total, 69 universities agreed to take part. All these universities were included in the final sample, with the intention of contacting 240 randomly-selected students from each institution. Separate samples of full-time and part-time students were drawn, with special provisions made for those institutions with medical schools. Also approached were 25 further education colleges (other degree-awarding institutions), with 19 taking part. From each of these institutions, 60 students were randomly selected.

[12]An opt-in questionnaire was initially sent to 16,524 students. However, for many of these students, either they were ineligible for the study or their contact details were not available. This at least partly explains why only 7,458 questionnaires were returned.

This data source offers the potential for a broader and less selective analysis than in most of the existing European studies (which focus on Business and Economics students at prestigious universities) described in the introduction. However, the level of response means it is important to consider whether the data accurately represent the general student population. This critical objective of the SIES was thoroughly investigated by the survey organisers, who concluded that they had 'succeeded in producing the objective of a nationally representative student sample'.[13] The survey organisers also modelled the probability of student response using the rich data available on the sampling frame and other auxiliary information. These data included the students' age, gender and previous qualifications, the quality of the institution they attend and whether their parents went to university.[14] Estimates from this model were used to create sampling weights that attempt to correct for the probability of a student being selected and responding. A second stage of weighting was also conducted to ensure the sex and age profile of students matched that of Higher Education Statistics Agency (HESA) records. It is evident that significant effort has been put into investigating and correcting any bias in the sample, to ensure it represents the student population in England and Wales. In Jerrim (2008), I check whether results hold with and without the application of these sampling weights.[15]

A critical part of the survey is how students report their wage expectations. They were each asked the following question:

> 'What sort of salary do you expect to be earning in the first job you take once you have graduated?'
> Interviewer comments: If not sure of the exact amount, please give your best estimate.

This question is similar to those asked in most other European studies on this topic. Students are asked for their expected salary, to be recorded in an open text field, allowing precise estimates. There is, however, little guidance on how they should interpret the word 'expect'. I interpret responses as students giving the arithmetic mean of all possible outcomes that they believe they face, though one cannot completely rule out the possibility that some groups may interpret this question in a different way (for example, what they believe to be the median of all possible outcomes). Another potential obstacle is that this question asks students about the first job they take after university, but not explicitly whether this will be full-time or part-time work, or a temporary position while they look for a job directly related to their career aspirations. Nevertheless, Dominitz and Manski (1994) suggest that

[13]Finch et al., 2006a, p. 10.

[14]More details can be found on page 32 of the 2004–05 SIES technical report, Finch et al. (2006b).

[15]Jerrim (2008) presents a model of wage expectations and discusses in more detail the data analysed. That paper also contains some results not presented in this paper.

students interpret questions regarding future salary expectations on the assumption that they will be in full-time employment. Thus it seems reasonable to assume that expected salary corresponds to students' first full-time job after university.

When interpreting the data, it is also assumed that students are providing a gross, yearly figure, as this is the standard method of advertising salaries in the UK.[16] Assumptions must also be made about how students deal with inflation when forming their wage expectations. A common assumption in most of the existing European literature is that students do not consider inflation, and are thus reporting in current prices, as discussed in Wolter and Zbinden (2002) and Brunello, Lucifora and Winter-Ebmer (2004).[17] Indeed, Brunello et al. ask a similar question to that presented above, with students given little direction on how to deal with inflation. They, however, go on to find inconsistencies with the idea that students take into account wage and price growth when reporting their expectations. I thus take a similar approach and assume students report their expectations in 'current' (2005) prices.[18]

Dominitz and Manski (1996) and Brunello et al. (2004) also note that respondents tend to round their estimates to questions on wage expectations. The histogram of expected salaries in Figure 1 shows that there is bunching of estimates, particularly at £15,000, £18,000 and £20,000. Thus there may be some rounding error in the data on students' wage expectations. However, assuming that students are as likely to round up as they are to round down, the impact of this on group-level analysis should be minimal.

To answer the research questions set out, wage expectations must be compared with data on actual graduate wages. Ideally, one would use longitudinal data, where a group of students are followed from reporting their expectations to being in the labour market. However, as in most of the other European studies, such data are not available in the UK. I therefore turn to an alternative method, described by Manski (2004), where average expectations are compared with average realisations using two comparable

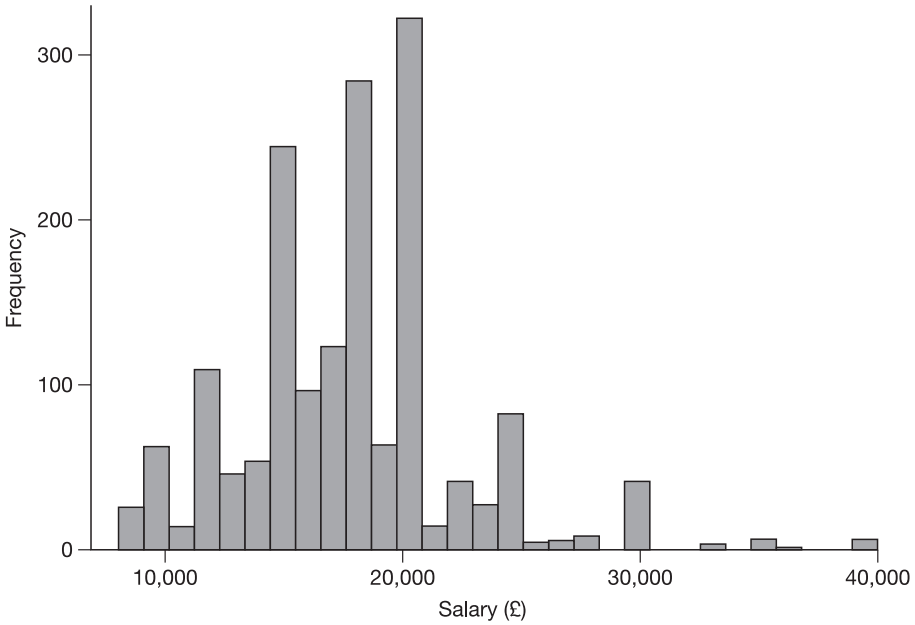
[16]The main conclusions of this paper hold even if I change these assumptions. For instance, I could instead assume that figures are reported after tax, or relate to monthly income, with no change to the general conclusions. Furthermore, the right-hand column of the row labelled 'Only those working full-time' compared with the previous row in table 8a of Jerrim (2008) shows how results would change if I also included part-time workers in the analysis.

[17]Ideally, students would have been formally instructed in the wording of questions not to consider inflation, as in Manski (1993) and Dominitz and Manski (1996). The latter paper reports that students generally adhere to this and do not consider inflation in their wage expectations. Thus, results from the existing European literature suggest that this is not an unreasonable assumption to make.

[18]I have checked how the results in Section IV change when making different assumptions – for example, that students actually incorporate price growth into their expectations. Most of my main conclusions remain intact, although the difference between average expected and average actual wages is slightly diminished.

FIGURE 1

Distribution of expected starting salary



Source: SIES data set.

cross-sectional surveys. Thus, I require a second cross-sectional data source that contains information on wages in the graduate labour market for the same cohort of students.

Data on graduate wages are drawn from HESA's Destination of Leavers Survey (DLHE). This survey is an attempted census of all 2005 graduates' employment circumstances, including their current salary, six months after completing university.[19] Students are contacted directly by the institution they studied at by postal questionnaire, with non-respondents followed up in a telephone interview, resulting in a survey response rate of around 80 per cent. The results are then linked with administrative data about the student collected by HESA, providing a rich source for analysis.

The DLHE has many features that make it a strong candidate to compare with the SIES expectations data. For instance, this survey was conducted in January 2006 and specifically refers to graduates who were final-year

[19]I choose to use data on actual graduate wages from a single year (2005). In doing so, I am assuming that the distribution of graduate wages remains stable over relatively short time horizons (for example, over a two- to three-year period). Likewise, I am assuming that the composition of students in each higher education subject and institution remains stable over this short horizon.

students in 2004–05 when the SIES expectations data were collected.[20] The question graduates were asked about their starting salary is also comparable to the expectations question asked to students in the SIES, being the following:

> 'What was your annual pay to the nearest thousand £, before tax?'
> Interviewer comments: If you were employed less than a year or were part-time, please estimate your pay to the full-time annual equivalent.

I apply several sample selection procedures, available in Table 1, to ensure the expectations (SIES) and realisations (DLHE) data focus on the same population. The DLHE data were restricted to students from England and Wales who had not entered postgraduate courses.[21] Only students who reported salaries of £8,000 or more and were working full-time are included.[22] Moreover, to limit the potential influence of previous labour market experience, and to target the particular group of interest, in both surveys the sample for *full-time* students was restricted to those below the age of 25. For *part-time* students, I include those of all ages to maintain a

TABLE 1

Sample selection rules for full-time students

Sample selection rule	*SIES expectations sample size*	*DLHE realisations sample size*
Full sample	2,659	256,507
English and Welsh universities only	2,659	224,226
First degree only	2,393	180,911
Salary above £8,000	2,339	178,491
Employed within UK only	2,339	168,673
Over-24s excluded	1,923	145,517
Doing 'something else' (e.g. further study / travel) excluded	1,923	117,660
Part-time workers excluded	1,923	87,327
Missing salary data excluded	1,828	45,906
Medics excluded	1,666	44,436

Notes: 'First degree' in the DLHE survey means excluding those in postgraduate study and those on foundation courses. The SIES collected expectations data only from those doing a first degree or a foundation course and not from postgraduate students.
Source: SIES and DLHE data sets.

[20]In the SIES, to ensure a reasonable sample size, wage expectations from students in all year groups are used, and not just those who are about to graduate. It is again assumed that students in all years report their expectations in current (2005) prices.

[21]It is assumed that respondents to the SIES were reporting their first wage expected after their undergraduate degree. The right-hand column of the row labelled 'First degree only' compared with the previous row in table 8a of Jerrim (2008) shows that my substantial conclusions do not change if I also include the wages of postgraduate students.

[22]Minimum wage laws in the UK meant that a full-time working graduate could not earn less than this amount in 2005.

reasonable sample size. Jerrim (2008) shows that the results presented in Section IV are robust to different sample selections and also provides an analogous version of Table 1 for part-time students.

The two data sets also contain some auxiliary information about students' employment prospects and outcomes. For instance, students in the SIES were asked whether they think they might take a temporary or 'fill-in' job upon completion of their course. They were also asked (on a five-point scale) to what extent they believe that growing competition in the labour market will make it hard for them to get a graduate job. The DLHE contains similar details for employment outcomes – in particular, whether holding a degree was any advantage to the graduates in gaining their current employment. Although the concepts captured in the two surveys have not been designed to be comparable, they nevertheless provide some useful additional information about students' views of the graduate labour market and later employment outcomes. I shall exploit this in the analysis that follows, illustrating whether my findings for the accuracy of students' wage expectations are consistent with young people's broader views on their employability.

As a further check for robustness, I will also use the Labour Force Survey (LFS) as an alternative data source for wages of recently-qualified graduates. Data come from 10 quarterly surveys, running from October 2005 to March 2008. These dates were chosen as they relate to when the students covered in the SIES would have graduated and entered the job market. Furthermore, from the October to December 2005 survey onwards, respondents were asked what qualifications they obtained in the last 12 months. I restrict the sample to respondents who reported that, in the last 12 months, they had obtained a 'degree level qualification, graduate membership of a professional institute, PGCE, or higher'.

One problem is that individuals who have just completed higher degrees or professional exams, such as a chartered accountancy qualification, are included in this sample. However, as per my selection rules for the SIES and the DLHE, I restrict the LFS sample to those under the age of 25. Most of this group are unlikely to hold such professional qualifications, and therefore the reported wage relates to respondents' first jobs after gaining a degree.[23] Other restrictions include only looking at those working full-time and earning over £8,000 a year.

[23]There are two outlying observations in the LFS data set who are unlikely to be recent first-degree graduates and who have probably just gained a professional qualification. These individuals had wages twice as large (over £80,000) as the next-largest observation (£40,000), and over six standard deviations higher than the mean. As the subset of Labour Force Survey data I analyse consists of just 196 observations, the inclusion of these outliers has a dramatic effect on the estimate of the mean. Therefore, when using the LFS, my preferred measure of central tendency is the median.

Gross weekly wages are used from respondents in their fifth, and final, wave of the survey, and scaled up to the annual equivalent.[24] For those surveys conducted in 2006–08, wages have been deflated to 2005 prices using the retail price index, under the previously stated assumption that students report expectations in today's (2005) prices. The final LFS sample size is 196 observations.

III. Issues of non-response and sample selection

One issue that I have yet to discuss, and has received only limited attention in the literature, is that of non-response and sample selection.

Regarding my comparison of the SIES and DLHE data sets, the former contains information on the wage expectations of all undergraduate students, while the latter only contains realised wages for those who have successfully completed their course and entered the labour force six months after finishing university (i.e. there is labour market selection). For instance, figures from the DLHE reveal that (for the sample selection described in Table 1) only 67 per cent of graduates are employed full-time six months after university, with 7 per cent unemployed, 16 per cent in further study and 7 per cent working part-time. This could introduce an element of bias into my comparison of average expected and average realised wages. If, for instance, students with too high expectations do not find a job, then it could lead to overestimation of the expectation–realisation gap. If, on the other hand, students with low wage expectations struggle to find employment, then the gap is likely to be underestimated.

A second (related) difficulty with the DLHE wage is that, of the 87,327 graduates who were working full-time, only 45,906 (53 per cent) provided information on their wage (i.e. there is also selectivity of salary response). This could also introduce some bias into my comparison of the SIES and DLHE data sets. Specifically, there could be disagreement between average expected and average actual wages due to who is deciding to work full-time and report their salary, rather than there being a genuine difference.

One way to try to account for this problem is via a Heckman-style selectivity correction.[25] The DLHE does not, however, contain an obvious exclusion restriction, meaning identification would be based solely upon functional form. As an alternative, I investigate the extent of selection into full-time work using a probit model, where the response is coded 1 if the

[24]Respondents to the LFS are asked for their wages in the first and fifth waves. However, since I am using 10 consecutive waves, there would be a problem of double-counting people if wage data were taken from both wave 1 and wave 5. For instance, someone who was in wave 1 during October–December 2005 would be in wave 5 during October–December 2006, and thus have their wages recorded twice. Hence only wages in wave 5 are used.

[25]Heckman, 1979.

TABLE 2
Probit model of whether the respondent's salary is observed

Variable	*Group*	*Marginal effect*	*SE*
Home location[a] (ref: London)	North East	–0.0269*	0.0067
	North West	–0.0258*	0.0048
	Yorkshire	0.0085	0.0056
	East Midlands	0.0264*	0.0057
	West Midlands	0.0195*	0.0053
	East	0.0133*	0.0053
	South East	0.0196*	0.0047
	South West	0.0158*	0.0055
	Isle of Man / Channel Islands	–0.0164	0.0186
University location (ref: England)	Wales	–0.0476*	0.0049
Term-time accommodation (ref: parental home)	University-maintained	0.0287*	0.0044
	Own home	0.0413*	0.0033
	Other	–0.0038	0.0047
Degree class[b] (ref: 1st)	2.1	0.0013	0.0041
	2.2	–0.0248*	0.0043
	3rd	–0.0677*	0.0061
	Unclassified	–0.0178	0.0116
UCAS score[c] mean centred (1 st. dev. increase)		0.0029	0.0018
University type (ref: post-1992[d])	Pre-1992	–0.0508*	0.0028
Subject (ref: Medicine)	Allied to Medicine	0.0267*	0.0116
	Biology	–0.1115*	0.0092
	Physical Sciences	–0.1030*	0.0092
	Maths	–0.0471*	0.0115
	Computer Science	–0.0292*	0.0105
	Engineering	–0.0079	0.0112
	Social Sciences	–0.0666*	0.0096
	Law	–0.1823*	0.0073
	Business Admin.	–0.0108	0.0103
	Mass Communication	–0.0908*	0.0099
	Languages	–0.1229*	0.0086
	History	–0.1366*	0.0084
	Art	–0.1781*	0.0075
	Education	–0.1134*	0.0093
	Combined	–0.0770*	0.0167
	Psychology	–0.0849*	0.0099
	Sports Science	–0.1106*	0.0095
	Other	–0.0754*	0.0115
Ethnicity (ref: White)	Asian	–0.0809*	0.0040
	Black	–0.0954*	0.0076
	Other/Mixed	–0.0411*	0.0077
Disabled (ref: no)	Yes	–0.0427*	0.0044
Gender (ref: male)	Female	–0.0538*	0.0026

Notes and Source to Table 2
[a]'Home location' refers to where the respondent's parents live.
[b]'Degree class' indicates graduates' final mark in their degree. A '1st' is awarded to roughly the top 10 per cent of students. The second-best grade is a '2.1', awarded to around 40 per cent of students. Below this, students can be awarded a '2.2' or '3rd', representing around 30 per cent and 10 per cent of the graduate population respectively.
[c]UCAS score refers to student performance on exams typically taken at age 18 in England and Wales, which largely determine university entry.
[d]'Post-1992' universities gained their university status in or after 1992. 'Pre-1992' institutions had university status before 1992, and generally admit students with a higher university entry score.
Notes: The response variable was coded 1 if the respondent was working full-time and reported their salary, and 0 otherwise. Therefore a negative coefficient implies a lower probability of observing their salary. * indicates significance at the 5 per cent level. SE is standard error. St. dev. is standard deviation.
Source: DLHE data set.

graduate was working and their wage observed and 0 otherwise (for example, if they were unemployed, travelling or continuing their studies, or they were working but chose not to report their wage). The drawback of this method is that I can only investigate differences in terms of observable characteristics (i.e. selection based on unobserved characteristics has not been accounted for when comparing the two samples). Results, in terms of marginal effects, can be found in Table 2.

There is some evidence of selection based on ability. Those obtaining a low (2.2 or 3rd) degree classification were *less* likely to be working and have their wages observed. Likewise, students at old research-intensive (pre-1992) universities were less likely to be observed than those at modern teaching (post-1992) institutions.[26] Other important factors include subject (Law, Art and History graduates are among the least likely to have observed wages), ethnicity (minorities are less likely to be observed than Whites), gender (males are more likely to be observed than females) and disability (those with a disability are less likely to be included).

To try to take these selection issues into account, I use the results from this probit model to create a set of inverse probability response weights. These weights attempt to 'correct' my estimate of the DLHE average graduate wage for labour market selection and salary non-response in terms of observable characteristics. Once these weights were applied, the estimated average graduate wage for full-time students *fell* from £16,500 to £15,900, a drop of roughly 3 per cent.[27] This suggests that selection based on *observable* characteristics has led to an underestimation of the expectation–realisation gap. Yet, as selection on unobservable characteristics is still possible (and could be working in the opposite direction), I cannot firmly

[26]One explanation is that students attending the former are more likely to continue their studies (for example, to complete a postgraduate qualification). See footnote 7 for details on the classification of higher education providers.

[27]One may note that these figures are lower than the 'official' HESA figure, fully explained in appendix 5 of Jerrim (2008).

state whether selectivity and non-response are leading to an upward or downward bias in my estimates.

The selected expectations and realisations samples, for those who reported wages, were then checked for comparability in terms of observable characteristics. The results are shown in Table A.1 of the online appendix,[28] with the response weights for the two surveys applied.[29] The weights for the expectations survey (SIES) adjust for unit non-response, while the weights in the realisations survey (DLHE) adjust for labour market selection and item non-response. The SIES response weight applied refers to those provided by the survey organisers. The DLHE weight refers to those I have created via the probit model just described.

Generally, the differences in observable characteristics are not particularly big, although there are some differences in gender, social class and subject compositions. For example, 46 per cent of the SIES sample is male, compared with 43 per cent in the DLHE. Alternatively, 53 per cent of the SIES sample attend a post-1992 university, compared to 54 per cent of the DLHE. Although one cannot rule out this difference in sample composition as a possible reason for a difference between expectations and later realisations, it does seem unlikely that this will lead to substantial bias in my results. Jerrim (2008) presents a similar table for part-time students, and shows how estimates differ with and without the SIES and DLHE weights applied. Results do not differ substantially from those presented in the following section.

As with the DLHE, labour market selection is also an issue in the LFS (I again only observe the wages of those who choose to work), although non-response to the information on salary is less of a problem. I deal with this in a similar manner to before – I estimate a probit model and produce a set of weights which I apply in my analysis to try to correct for this problem in terms of observable characteristics.[30]

[28]Published at http://www.ifs.org.uk/docs/fsdec11_jerrim_appendix.pdf.

[29]Initial analysis, not presented, suggested a difference in the proportion of medical students contained in the two surveys (8 per cent of the SIES compared with 2 per cent of the DLHE). Thus medical students are excluded in many parts of the analysis, due to the difference between the two surveys and the quite different labour market these individuals face. The right-hand column of the row labelled 'Medics excluded' compared with the previous row in table 8a of Jerrim (2008) shows how this influences my (unweighted) estimates of expected and actual wages. The main conclusions hold if medical students are included in the analysis.

[30]The LFS contains information on characteristics such as gender, marital status, subject studied at university and degree classification. I include these factors in a probit response model and produce response weights using the same methodology as described for the DLHE above. I apply these weights when using the LFS survey.

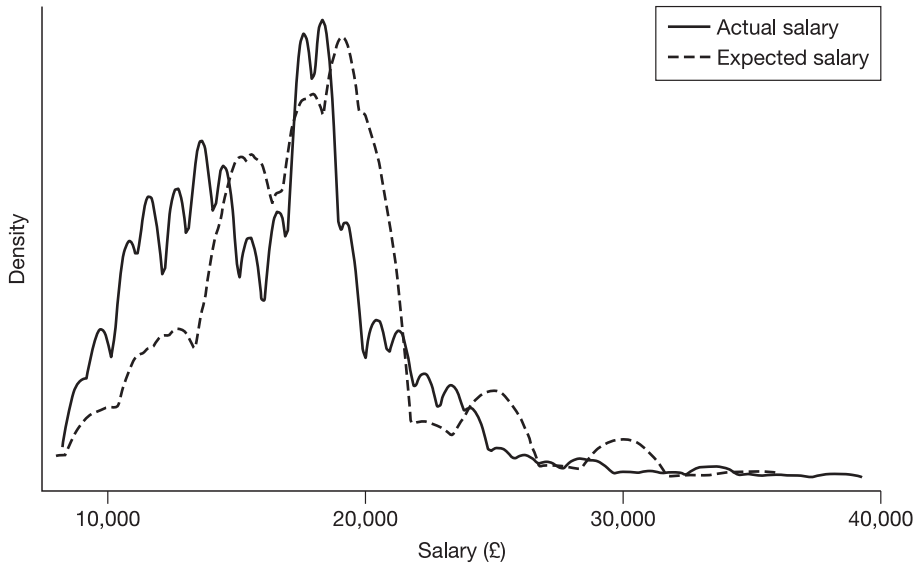
IV. Comparison of expected and actual wages

I begin by investigating whether full-time students can, on average, predict their starting wage. Kernel density estimates of the expected and actual wage distributions are presented in Figure 2. The solid line represents the distribution of graduates' starting salaries, while the broken line refers to their expectations. The two distributions clearly differ, with expected wages tending to be to the *right* of actual wages. I confirm that the distributions are not equivalent by conducting a two-sample Kolmogorov–Smirnov (KS) test, easily rejecting the null hypothesis of equality at the 1 per cent level. There is hence an indication that full-time students tend to overestimate their starting salary.

I explore this issue further in Table 3 by comparing the average expected and average actual wage. Students expect to earn, on average, a starting salary of £18,300. In reality, the average graduate salary reported in the DLHE (after accounting for non-response and labour market selection) is £15,900. Hence I estimate that full-time students overestimate their first wage by an average of £2,400 (15 per cent). Using a two-sample t-test for the equality of means, I find this difference is statistically significant at the 5 per cent level. I check the robustness of this result to outlying observations by conducting a two-sample t-test on *log* expected and *log* actual earnings,

FIGURE 2

Kernel density estimates of the distributions of actual and expected salaries for full-time students



Source: SIES and DLHE data sets.

TABLE 3

Comparison of average expected and actual salary for full-time students

	Average expected salary	*Average realised salary*	*Difference (expected – actual)*
Full-time students			
N	1,684	44,436	–
Mean wage (£000)	18.3	15.9	2.4*
Median wage (£000)	18.0	15.1	2.9*
Part-time students			
N	784	9,942	–
Mean wage (£000)	22.6	23.3	–0.7
Median wage (£000)	21.0	22.8	–1.8*

Notes: All calculations are with weighted data. See Section III for more details. Average realised wage relates to the data drawn from the DLHE; average expected wage comes from the SIES sample. * indicates that the difference is statistically different from zero (where average expectation equals average realisation) at the 5 per cent level. Equality of medians is tested using the Wilcoxon rank-sum test; however, this test is unable to take into consideration the complex survey design, which is likely to mean that the standard errors on which this test is based are likely to have been underestimated.
Source: SIES and DLHE data sets.

and a Wilcoxon rank-sum test for the equality of medians.[31] Both support the above conclusion.

Results are also robust to using an alternative data set for actual graduate wages. Figure 3 compares the distribution of students' expected wages and the distribution of actual graduate wages recorded in the Labour Force Survey. Once again, it is quite clear that the distribution of students' wage expectations is to the right of the LFS graduate wage distribution. It appears that full-time students overestimate their starting salary by somewhere between 10 and 20 per cent, depending on the measure of central tendency used.[32] Again, this difference is statistically significant based on either a two-sample t-test or a Wilcoxon rank-sum test. Generally, there is strong support for the conclusion that full-time students overestimate (on average) their first wage.

Various factors could be driving this difference between average wage expectations and later realisations. One possibility is that students misjudge their employment opportunities upon graduation. For instance, only 14 per cent of students in the SIES report that they are planning to get a 'temporary

[31]Throughout the course of this section, I use three methods to compare average expectations and realisations. I mainly test significance for the equality of means using a two-sample t-test. In results not presented, I have checked robustness by performing the same test using the natural logarithm of wages rather than the raw figures. Moreover, at various points I also check that my findings are robust to using an alternative non-parametric test (the Wilcoxon rank-sum test for equality of medians).

[32]The preferred measure (median) suggests students overestimate by 19 per cent. Using the mean, overestimation is somewhere between 10 and 15 per cent, depending on how one treats some very large outlying observations. Footnote 23 gives further details.

FIGURE 3

Kernel density estimates of the distributions of actual and expected salaries using Labour Force Survey data

Source: SIES and LFS data sets.

or fill-in' job after university, whereas the DLHE data indicate that 28 per cent of graduates were working in a role where a degree was 'no advantage' in obtaining their employment. Although this difference must be treated cautiously, given the comparability of what respondents are being asked, it nevertheless seems to support the view that students are generally too optimistic about their prospects in the graduate labour market.

1. Differences between subjects

I have shown above that full-time students tend to overestimate their starting salary. This may, however, be masking the fact that students enrolled in certain subjects actually make quite good predictions of their labour market future, while other groups' forecasts are particularly poor. I initially explore this issue via kernel density estimates of the expected and actual wage distributions for students enrolled in three different disciplines. These can be found in Figure 4.

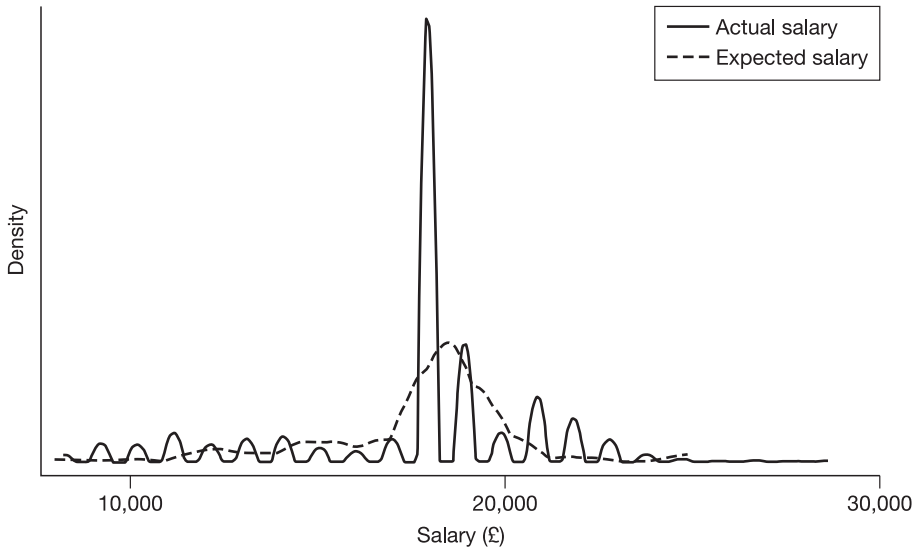
In panel a (Education students), there is a mass of observations for actual wages at £18,000 (reflecting the UK's national pay scale for teachers), with Education undergraduates having salary expectations (the broken line) that centre on this point. The two distributions for Engineering, Maths and Computer Science students (panel b) also seem to largely overlap. On the

other hand, expected wages are clearly to the right of actual wages for those completing English, Languages and History degrees (panel c).

FIGURE 4

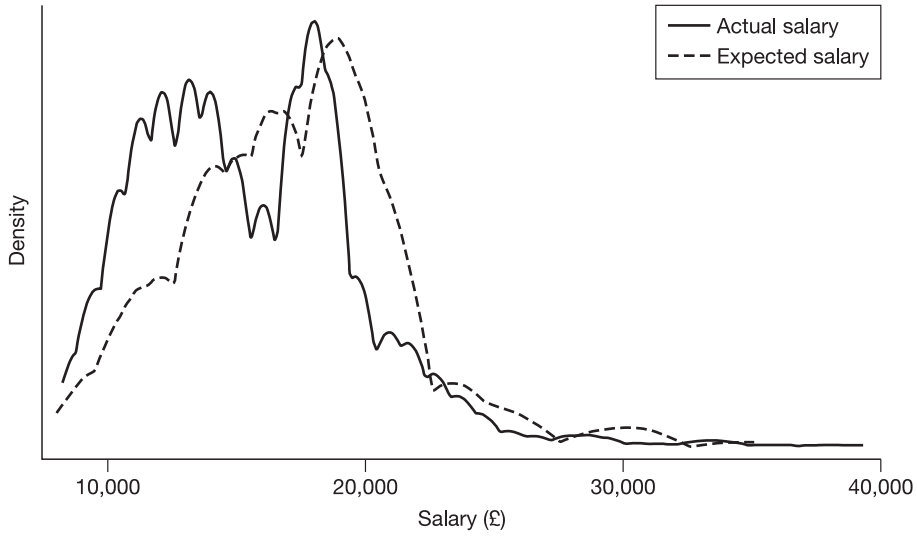
Kernel density estimates of the distributions of actual and expected salaries across subjects

(a) Education



(b) Engineering, Computer Science and Maths

(c) History, English and Languages



Source: SIES and DLHE data sets.

I investigate this pattern further in Figure 5, which presents the estimated gap between average expected and average actual wages for 10 subject groups. I indicate where differences between these disciplines are statistically significant in the text that follows, with a full subject-by-subject breakdown available in Table A.2 of the online appendix.[33]

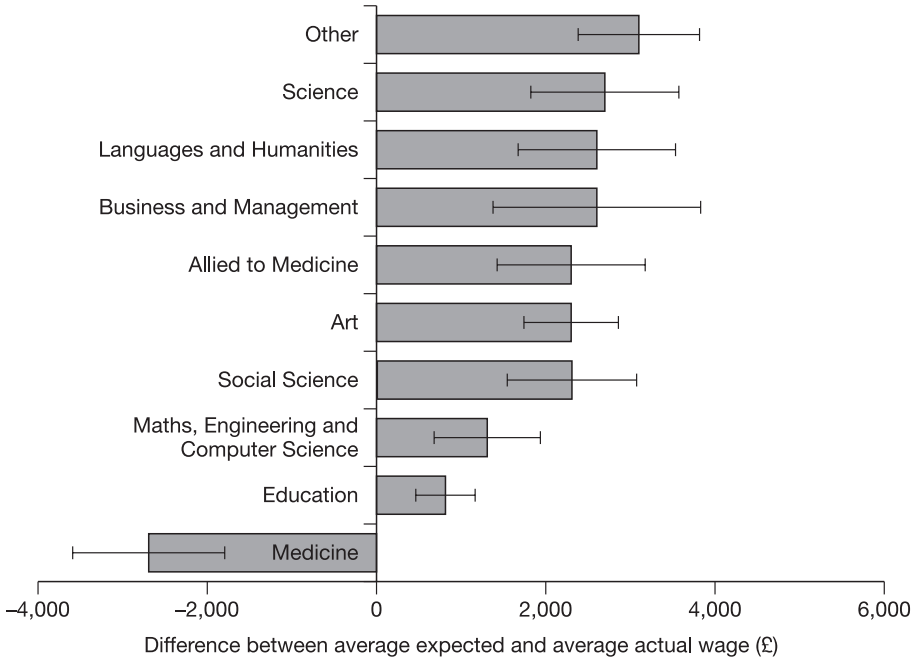
It seems that students in almost every discipline overestimate their starting salary (on average). Nine of the ten subject groups have average expectations above average realisations, with the null hypothesis of no difference rejected on every occasion. It is interesting to see that the difference is quite small amongst most subject groups. Yet there are some disciplines that do stand out. The most obvious is Medicine, where students tend to *underestimate* their future wage. Education is another, where students overestimate their starting salary by a comparatively small amount (an average of just £800). This is significantly less (at the 1 per cent level) than for their peers on courses in all other disciplines apart from Medicine and Maths / Engineering / Computer Science. This last group of students also seem to make better predictions than those in other subjects – a two-sample t-test suggests that this group overestimate their starting wage by significantly less (at least at the 10 per cent level) than those in all other disciplines (with the exception of Medicine and Education).[34]

[33]Published at http://www.ifs.org.uk/docs/fsdec11_jerrim_appendix.pdf.

[34]Although the confidence interval for Maths overlaps with those for other subjects in Figure 5, this does not by itself mean that there is not a statistically significant difference. Rather, a formal test for

FIGURE 5

Difference between expected and actual salaries across 10 subject groups



Notes: The thin line through the centre of each bar represents the estimated 90 per cent confidence interval. See Table A.2 for tests of whether there is a statistically significant difference between each of the subject groups.
Source: Author's calculations using the SIES and DLHE data sets.

2. Differences between institutions

The difference between average wage expectations and later realisations may also vary between full-time students enrolled in different types of institution. In this paper, I divide universities into two broad groups: post-1992 and pre-1992 institutions (this is one common way to classify higher education providers in the UK). The former gained their university status in or after 1992 and are generally not research intensive. They also tend to admit, on average, students with lower university entry scores (i.e. lower A-level grades). The pre-1992 institutions gained their university status before 1992, are generally more research intensive and tend to admit students with higher levels of academic attainment. From this point on, I refer to post-1992 universities as 'modern' and pre-1992 as 'old'.

differences between groups is required (results of such a test are provided in Table A.2). See Maghsoodloo and Huang (2010) for a discussion of this issue and the related literature.

My analysis suggests that full-time students at old universities expect to earn an average of £18,700, yet their average actual pay is £16,700. Hence this group tend to overestimate their starting salary by £2,000 (12 per cent). On the other hand, the average wage expected by those in modern institutions is £17,900, but their actual average wage is £15,200 – a difference of £2,700 (18 per cent).[35] Hence it seems that students at modern universities tend to misjudge their starting salary by slightly more than those at old institutions, although this difference is not quite significant at the 10 per cent threshold ($p = 0.13$).

I break this result down further in Table 4 by considering the extent of overestimation for students enrolled in different courses within these two types of institution (for example, for an Art student within a modern university versus an Art student at an old university). Again, I describe where there are statistically significant differences between certain groups in the text that follows, with a full breakdown provided in Table A.3 of the online appendix.[36]

Given the small sample sizes, caution is required when interpreting these figures. There are, nevertheless, some striking results. Table 4 reveals that Art students at old institutions overestimate their starting salary by an average of £900, significantly less (at the 5 per cent level) than for those doing a similar course at a modern university (£2,500). The same pattern holds for Business/Management students: those at old institutions overestimate their first wage by an average of £800, compared with £3,400 for their peers at a modern equivalent (this difference is statistically significant at the 5 per cent level). Social Science is another example where the gap is sizeable (overestimation of £1,700 compared with £3,100) and statistically significant at the 10 per cent level. Another comparison that is commonly made in the UK is between undergraduates studying a Maths-based course at an old university versus their peers studying for an Art, Humanities or Social Science qualification at a modern institution. Table 4 indicates that the Maths students at old institutions overestimate their first wage by an average of £1,000 (5 per cent), significantly less than figures of near £3,000 (20 per cent) for students enrolled in more creative subjects at modern universities. Generally speaking, the former tend to come from higher socio-economic backgrounds and are higher academic achievers than the latter. This may, by implication, indicate an equity issue – overestimation of starting salary seems to be greatest amongst students enrolled in subjects

[35]I have excluded medical students from this analysis. This group face quite a different labour market from other groups, and receive wages in their first job that are generally a lot higher than those of other graduates. Medical students also disproportionately attend old institutions. Hence I drop this group when comparing the overall difference between institutions to stop this quite select group skewing the results.

[36]Published at http://www.ifs.org.uk/docs/fsdec11_jerrim_appendix.pdf.

TABLE 4

Comparison of average expected and actual salary for full-time students enrolled in different subjects and institutions

	Expected salary		*Actual salary*		*Difference (£000)*
	N	Salary (£000)	N	Salary (£000)	
All institutions					
Medicine	155	25.8	1,437	28.5	–2.7*
Education	136	17.9	2,576	17.1	0.8*
Maths etc.[a]	163	19.6	6,394	18.3	1.3*
Social Science	228	18.9	4,489	16.6	2.3*
Art	231	16.4	3,924	14.1	2.3*
Allied to Medicine	92	19.0	3,115	16.7	2.3*
Business & Management	142	18.9	6,480	16.3	2.6*
Languages & Humanities	230	17.7	7,506	15.1	2.6*
Science	159	18.3	3,851	15.6	2.7*
Other	285	18.5	6,150	15.4	3.1*
Post-1992 institutions					
Medicine		–		–	–
Education	111	17.7	1,996	16.9	0.8*
Maths etc.[a]	79	18.4	2,868	16.9	1.5*
Social Science	82	18.2	1,765	15.1	3.1*
Art	205	16.5	3,224	14.0	2.5*
Allied to Medicine	58	19.0	1,528	16.9	2.1*
Business & Management	107	19.0	4,726	15.6	3.4*
Languages & Humanities	75	17.4	3,477	14.5	2.9*
Science	63	18.1	1,229	14.6	3.5*
Other	162	18.3	3,734	14.9	3.4*
Pre-1992 institutions					
Medicine	155	26.1	1,437	28.5	–2.4*
Education	25	18.9	580	17.7	1.2*
Maths etc.[a]	84	20.5	3,526	19.5	1.0*
Social Science	146	19.2	2,724	17.5	1.7*
Art	26	15.6	700	14.7	0.9
Allied to Medicine	34	18.9	1,587	16.5	2.4*
Business & Management	35	18.7	1,754	17.9	0.8
Languages & Humanities	155	17.9	4,029	15.5	2.4*
Science	96	18.4	2,622	16.0	2.4*
Other	123	18.7	2,416	15.9	2.8*

[a]'Maths etc.' refers to Maths, Engineering and Computer Science.

Notes: Data for medical students at post-1992 institutions have been excluded due to the small sample sizes. All wage data refer to weighted figures. Sample sizes are unweighted. * indicates where the difference is statistically different from zero at the 5 per cent level.

Source: SIES and DLHE data sets.

and institutions where there are higher intakes of lower achievers and lower socio-economic groups. It may therefore be that more information, advice and guidance are particularly needed by individuals with these characteristics.

3. Differences between year groups

Students who are further through their course (and thus closer to the graduate labour market) may make better predictions of their starting salary than their peers who have just begun higher education. My analysis indicates that this is indeed the case. Whereas final-year students overestimate their starting salary by (on average) £1,800 (standard error = £283), those who have just entered university overestimate by £3,000 (standard error = £290) – a sizeable (£1,200) and statistically significant difference. This result is, however, particularly sensitive to the assumption I am making about inflation (that expectations are reported in current prices). If I were to assume instead that students incorporate price increases into their expectations, I would find almost no difference in results by year group.

Therefore, to check the robustness of this result, I investigate the auxiliary information on employment plans contained within the SIES survey. In particular, I put forward the argument that if junior students really are more upbeat about their future earnings prospects (and are not just adjusting their expected wages upwards to account for future inflation), then they should also hold more positive views about other aspects of the graduate labour market. Data from the SIES support this view. Only 10 per cent of first-year students believe that they will take a 'fill-in' job after university, compared with 18 per cent of those coming to the end of their course. Likewise, only half the first-year students questioned were concerned about growing competition in the graduate labour market, compared with over 70 per cent of those about to graduate. Taken together, I consider this to support the conclusion that young adults who have just entered university are particularly likely to overestimate their first wage.

4. Part-time students

All of the results above relate to full-time students. I now investigate whether part-time students also tend to overestimate their starting salary. Figure 6 provides kernel density estimates of the expected and actual (DLHE) wage distributions for this group.[37]

[37]The Labour Force Survey unfortunately does not contain information on whether the respondent completed their degree part- or full-time. Hence I am unable to use this alternative data source to check the robustness of these results.

FIGURE 6

Kernel density estimates of the distributions of actual and expected salaries for part-time students

Source: SIES and DLHE data sets.

The distribution of wage expectations for part-time students is very similar to that of the realisations, with the means differing by just £700 (3 per cent). This is significantly different from my results for full-time students, who overestimated their starting salary by an average of £2,400 (15 per cent). Interestingly, I do not find that part-time students who are closer to graduation hold more accurate expectations (on average) than those who have just begun their course (recall that this is quite different from my results for full-time students described in Section IV.3). One explanation might be that in my sample selections I have included part-time students of all ages in contrast to only full-time students under 25. Hence part-time students' better predictions may be due to their greater experience of (and information about) the world of work. Part-time students may also already be employed in their chosen occupation, and have a good understanding of pay rates in their likely future career (this is consistent with my finding that part-time students in the first year of their course make equally accurate predictions to those part-time students who are about to graduate). Full-time students, on the other hand, are probably less certain about their future vocation, and can therefore draw upon only rather broad sources of information about graduate starting salaries.

V. Summary, discussion and conclusion

With a market place for higher education looking ever more likely, it is becoming increasingly important for young adults to understand the prospects they will have when entering the graduate labour market. Yet little is known about whether students' wage and employment expectations are in line with actual later outcomes in the UK. I have therefore investigated this topic using recently-collected data for a sample of British university undergraduates. My results suggest that, on average, full-time students overestimate their starting salary by roughly 15 per cent. However, the difference between average expectations and attainment for some groups is even more severe. For instance, full-time students who have just entered university overestimate their starting salary by almost 20 per cent, as do those studying for an Art or Humanities degree at a 'post-1992' ('modern') institution.

Some caution is, however, required when attempting to draw policy recommendations from this result. First, I cannot completely rule out the possibility that selectivity of response and the composition of the two surveys are generating part of the observed gap between expectations and realisations. However, I have very carefully checked the quality of my data, and performed several robustness tests, to minimise the impact of this on my results. Nevertheless, the reader should keep in mind that I have only been able to correct for issues such as sample selectivity and survey non-response in terms of students' observable characteristics (i.e. possible selection based on non-observable factors has not been taken into account). Second, as noted in the introduction, one might argue that the gap I find between expected and actual wages may not be a problem per se. It may be that high expectations lead to students applying more effort in their job search, ending with higher wages and a better match between employers and employees. Similarly, it could be that high expectations motivate students to work harder in their studies, as they attempt to reach what turn out to be quite ambitious goals. A third possibility is that this result is not due to a lack of information (as I have argued throughout the course of this paper). Rather, it may be that students are actually quite knowledgeable about the graduate labour market, but are unable to use this information to accurately form predictions of the future.[38]

I believe, however, that students' lack of knowledge about the graduate labour market is perhaps the most compelling reason why expectations and realisations diverge, given the other results in this paper. For instance, the

[38]Chevalier et al. (2009), for instance, suggest that undergraduates in the UK tend to overestimate their academic ability. Hence it may be that the vast majority of undergraduates overestimate their chances of obtaining a first- or upper-second-class honours degree and, consequently, their place on the graduate wage distribution (even if they know what this distribution is and how it varies with selected characteristics).

superior predictions of those who are about to graduate could be driven by a greater incentive to collect information as the labour market approaches. This group may also have lower costs of acquiring such information, due to their close interaction with recent graduates. Similar arguments can be made for other groups who make relatively good predictions. For instance, Education students may be able to predict their future wage because they know the career they are likely to enter and national pay scales provide them with accurate information on salaries at a very low cost.

If this final interpretation is correct, then it could be that some young people are basing their human capital investment decisions upon mistaken economic views of the future. What then can be done to correct this issue and help young adults weigh up the financial implications of their different educational options? One possibility is that students tend to overestimate their starting salary because they do not have enough information on graduate wages or labour market returns. Providing more detail on the distribution of graduate earnings, including a breakdown by subject and institution, is therefore one policy option. Publishing such data will, of course, not tell young people the full story about their labour market earnings potential (their wages will also be driven by unobserved factors such as their motivation), but will nevertheless act as a helpful guide. Yet an alternative explanation for the gap I find between expected and actual wages is that students are uncertain about the type of job they will be working in after university. Indeed, I cannot rule out the possibility that young adults are actually well informed about starting salaries, but misjudge the probability of entering a specific occupation or career. More information may therefore be required on the jobs graduates enter, and how these vary with selected characteristics (for example, subject, institution and prior academic achievement). Unfortunately, weighing up the importance of these two possibilities is beyond the scope of the available data, meaning it is not possible for me to indicate the most efficient type of information for the government to provide.

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