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Issues paper
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This report examines the rates of completion for a cohort of students attending UK higher education institutions who began a doctorate degree mainly by research in academic year 1996-97. It is intended to inform discussion about the quality of supervision of postgraduate research in general, and the time and rate of PhD completion in particular.

PhD research degrees

Entry and completion

HIGHER EDUCATION FUNDING COUNCIL FOR ENGLAND

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PhD research degrees: Entry and completion

To	Heads of publicly-funded higher education institutions in the United Kingdom
Of interest to those responsible for	Student data, Research, Planning
Reference	2005/**02**
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Executive summary

Purpose

1. This report examines the rates of completion for a cohort of students attending UK higher education institutions who began on a doctorate degree mainly by research in academic year 1996-97. It is intended to inform discussion about the quality of supervision of postgraduate research in general, and the time and rate of PhD completion in particular.

Key points

2. In this document the term 'PhD' is used to refer to all 'doctorate degrees mainly by research', including small numbers of specialist doctoral degrees such as Doctor of Education (EdD) and Doctor of Engineering (EngD).

Entry to PhD programmes

3. For full-time students, 35 per cent progress directly from a first degree or MSc to a PhD programme from the same higher education institution (HEI); 27 per cent from a different HEI; and 38 per cent did not qualify at undergraduate or MSc level in the year before. The equivalent figures for part-time students are 12 per cent, 9 per cent and 78 per cent.

Progression

4. The progress of students was followed for seven academic years, from their start in 1996-97 through to 2002-03. Over that period we find that:

a. 18 per cent of those who start as full-time students change to part-time, and 11 per cent of those who start as part-time students change to full-time.

b. 4 per cent of students move between institutions during their programme.

c. 10 per cent of students take a break of at least one whole academic year during their programme.

d. 11 per cent of full-time students and 28 per cent of part-time students are still actively following their programme in 2002-03, seven years after they began.

Outcomes

5. A student is defined as completing when they have been awarded a PhD and the 'qualification obtained' has been returned through the individualised HESA student record. This will typically be up to a year after the student submitted their thesis for assessment.

6. Following this definition we find that by 2000-01, after five years, 57 per cent of PhD students who began their studies on a full-time course, and 19 per cent starting on a part-time course had completed. By 2002-03, after seven years, the completion rates were 71 per cent and 34 per cent for full-time and part-time starters respectively.

7. 5 per cent of full-time students and 3 per cent of part-time students gain an MPhil within seven years. This results in 74 per cent of full-time students and 37 per cent of part-time students gaining an MPhil, a PhD or both.

8. Significant and material differences in the rate of PhD completion are found for differences in financial backing, by student domicile, by age on entry, by previous qualifications and by subject, as well as by mode. The following were shown to be associated with higher rates of completion:

- students with financial backing, particularly from Research Councils, charities or the British Academy
- students from overseas
- younger students
- students following programmes in the natural sciences.

9. The low completion rates for part-time students are due in part to the fact that there are fewer part-time students with the characteristics associated with high completion as described above.

Differences in completion rates between institutions

10. There is significant and material variation in PhD completion rates for full-time students when considering individual institutional and departmental rates, even after taking into account all the other student and programme factors found to be associated with completion rates.

11. However for part-time students, although the modelling shows that the institutional variation is statistically significant, this variation is not materially different from what we would expect from random variations between individual students.

Action required

12. No action is required in response to this document.

Introduction

The policy context

13. The 1996 Harris report ('Review of Postgraduate Education', HEFCE report M 14/96) is a convenient starting point for describing current policies on quality of research supervision. It argued that research students should normally only attract HEFCE research grant in subject areas within institutions which 'have a pervasive research culture, and can deliver excellence in research education'.[1] After that report was published HEFCE introduced a threshold of research quality, determined by the Research Assessment Exercise (RAE), for an institution to receive HEFCE funding for the supervision of postgraduate research students. The HEFCE Review of Research (HEFCE 00/37), published in 2000, then concluded that there was a need to ensure that 'postgraduate students had access to supervision of the appropriate standard'. The Review concluded that this might best be achieved by establishing specific criteria for judging whether the appropriate standard was being met. The details of these criteria were not set out, but HEFCE was urged to accept the principle and work on the practicalities.

14. This approach gained broad support, and a project was commissioned by the UK higher education (HE) funding councils to determine the role of threshold standards and conditional funding in improving standards in research degree programmes.[2] The project team reported in 2002, and among its recommendations it proposed that completion rates be monitored. Following further consultation, HEFCE is putting in place procedures to monitor completion rates with a view to using them, in combination with other information, to inform the Quality Assurance Agency for HE (QAA) as to where there may be problems (see HEFCE Circular letter 18/2004). The QAA has also published a draft revised code of practice for postgraduate research programmes[3] in which it proposes that institutions monitor the success of their postgraduate research degree programmes. The measures suggested for this monitoring include completion times and rates.

Information available about PhD completion in the UK

15. These developments have taken place with only limited information relating to PhD completion. Apart from reports of studies undertaken by individual institutions, the only up-to-

[1] In this, and subsequent discussions, 'standard' and 'standards' have not been used in the usual sense to refer to 'level' as distinct from 'quality' or fitness for purpose. 'Standard' in this context means a particular minimum quality of provision. In the Review of Research (HEFCE 2000/37) 'facilities and quality of the environment' is given as an example of what should be specified to meet the appropriate standard.

[2] 'Improving standards in postgraduate research degree programmes' available on the HEFCE web-site under Publications/R&D reports

[3] QAA (2004), 'Draft revised Code of practice for the assurance of academic quality and standards in higher education, Section 1: Postgraduate research programmes', QAA Circular letter CL 08/04. Available at: www.qaa.ac.uk/public/COP/cop/draft/CircularCL0408.htm

date statistics for the UK previously available are the submission rates published by the Office of Science and Technology (OST).[4] No details are provided as to the definitions used in preparing these statistics which vary slightly between different Research Councils. The most usual features are set out below:

a. Students who terminated within one year are generally excluded.

b. Students who do not complete a PhD but who submit for an MSc within a certain time frame are usually counted as having submitted.

c. Students who die before they can submit within the four-year period are excluded.

d. Students may be granted a suspension of their award, or an extension, during the life of their award or in the final unfunded year before submission. Suspensions or extensions may be granted for: medically certificated illness, maternity, bereavement, the severe illness of a family member or disruption events such as divorce. Where a suspension or extension is granted the submission date is extended accordingly. In most cases those given a suspension/extension will be included in the statistics for the following year;

e. Part-timers (minimum 50 per cent) are counted seven years after starting.

16. These statistics are limited to students funded by the Research Councils, and they provide no further breakdowns to show how these rates are associated with student or programme characteristics. The submission rates are available at: www.ost.gov.uk/setstats/5.htm

Information on PhD completion provided in this report.

17. The results reported here are based on all students who began a PhD (or MPhil leading to PhD) in academic year 1996-97 at a UK HEI. The activity of these students was followed for up to a maximum of seven years. This provides information on a more recent cohort than the OST study, covers students without, as well as with, Research Council support, and explores some of the factors associated with completion. It is intended to inform discussion about the quality of supervision of postgraduate research in general, and the time and rate of PhD completion in particular.

Outline of discussion

18. There is a summary description of the data sources used in the analysis, entry routes to PhD programmes, and information on the time taken to complete, but the discussion centres on whether students complete.

19. The annexes of the report describe the exact data definitions used, the method for tracking students through the data, and the statistical models used in modelling propensity to complete a PhD.

[4] OST (2004), 'SET Statistics: science, engineering and technology indicators', Section 5, Figure 5.2 and Table 5.12.

Data source and the definition of the cohort

Data source

20. Data are drawn from the Higher Education Statistics Agency (HESA) individualised student records from 1995-96 through to 2002-03. (These data are collected annually for students registered at a UK higher education institution.) In practice this was the longest period we were able to take. HESA records only began in 1994-95, and the first collection had relatively weak quality assurance processes. We also need to track back at least one year to ensure that a student is a genuine starter – in other words, one who is not present on the same PhD course in the previous year. For these reasons 1996-97 was the earliest starting cohort that could be used. 2002-03 is the most recent collection available.

21. We tracked individual student records within and through each annual student dataset using a number of characteristics of the individual. The underlying tracking system is the same as the one used in our undergraduate retention performance indicators (see www.hefce.ac.uk/pi). More details are at Annex B.

22. In interpreting the results, it is important to appreciate that the reporting of a PhD or MPhil award is likely to occur around a year after completion. The reporting year for HESA records is 1 August to 31 July. An award confirmed in, say, September 2000 would be returned with the 2000-01 record, or possibly later.

Definition of the starting cohort

23. There are technical difficulties in ensuring that all and only those students who are starting are included in our count. The details of how this is achieved, and other aspects of the data definitions, are described at Annex A.

24. Having identified those students we believe are starting a postgraduate research programme, there is a further difficulty in dealing with students who start an MPhil. In many cases, such students will be setting out with the plan, and expectation, of completing a PhD programme. In such cases their initial identification as an MPhil student may simply be the result of a formal decision of the institution. Alternatively, the student may only intend to complete an MPhil. From the HESA record alone it is not possible to distinguish between these cases. In this study we exclude those who start with MPhil as a qualification aim and who do not change this to a PhD, nor complete a PhD within the seven year period. This will result in a slight over-estimation of the true completion rate.

25. In addition, we exclude students who do not progress from the first year of their programme. This follows the practice of the Research Councils in calculating the submission rates of the students they support.

26. Tables 1 and 2 provide a breakdown of the numbers of students falling in and out of our cohort definition.

Table 1 Initial starters to PhD programme

Qualification aim			Number of students included or excluded in initial starter count	
Initial	**Highest up to 2002-03**	**PhD awarded**	**Included**	**Excluded**
PhD	PhD	Yes	7,490	106
PhD	PhD	No	5,916	45
MPhil	PhD	Yes	3,862	7
MPhil	PhD	No	1,888	*
MPhil	MPhil	Yes	35	*
MPhil	MPhil	No	0	4,814
Initial PhD programme starters			**19,191**	**4,977**

* indicates a value of 5 or less in the cell.

27. The 19,191 initial PhD programme starters split into 14,041 starters to full-time programmes, and 5,150 starters to part-time programmes. Table 2 shows how many of the full-time initial PhD programme starters do not continue beyond their first year. The corresponding part-time numbers are in Table 3.

Table 2 Initial full-time programme starters

Initial PhD full-time programme starters	14,041
Initial full-time starters who do not continue beyond first year	369
Starting cohort used for analysis	**13,672**

Table 3 Initial part-time programme starters

Initial PhD part-time programme starters	5,150
Initial part-time starters who do not continue beyond first year	299
Starting cohort used for analysis	**4,851**

28. References to a ‘PhD programme’ in this paper refers to those students starting a PhD or MPhil that meet the criteria in the ‘starting cohort used for analysis’ in Tables 2 and 3.

29. Note that the same starting cohort is used for all the analysis in this report, whatever time period for completion is being considered.

Entry to PhD programmes

30. By linking back to the 1995-96 HESA student record, we can identify which students progressed directly from a first degree or MSc.

31. Table 4 shows the qualifications achieved in 1995-96 prior to PhD programme entry for those full-time home students within our selected starting cohort.

Table 4 Qualifications in previous year for full-time home students

HEI attended	Qualification in previous year		No. of students	% of students
Same HEI	Masters		684	8%
	Degree	First	1,015	12%
		Upper second	1,016	12%
		Other	129	2%
	Total from same HEI		***2,844***	***35%***
Different HEI	Masters		624	8%
	Degree	First	639	8%
		Upper second	888	11%
		Other	89	1%
	Total from different HEI		***2,240***	***27%***
No masters/degree award			3,069	38%
All			**8,153**	**100%**

32. We go on to separate these full-time students into those who are funded by a Research Council (Table 5), and those that receive other or no funding (Table 6). Table 5 shows that only 28 per cent of Research Council funded students did not study for and gain a masters or degree award in the previous year. The corresponding figure for non-Research Council students is 44 per cent.

Table 5 Qualifications in previous year for full-time home Research Council students

HEI attended	Qualification in previous year		No. of students	% of students
Same HEI	Masters		215	7%
	Degree	First	535	17%
		Upper second / other	478	15%
	Total from same HEI		***1,228***	38%
Different HEI	Masters		222	7%
	Degree	First	369	12%
		Upper second / other	504	16%
	Total from different HEI		***1,095***	34%
No masters/degree award in previous year			884	28%
All			**3,207**	100%

Table 6 Qualifications in previous year for full-time home non-Research Council students

HEI attended	Qualification in previous year		No. of students	% of students
Same HEI	Masters		469	9%
	Degree	First	480	10%
		Upper second / other	667	13%
	Total from same HEI		***1,616***	33%
Different HEI	Masters		402	8%
	Degree	First	270	5%
		Upper second / other	473	10%
	Total from different HEI		***1,145***	23%
No masters/degree award in previous year			2,185	44%
All			**4,946**	100%

33. Table 7 shows the qualifications achieved in 1995-96 for students entering part-time PhD programmes in 1996-97. Over three-quarters of these students did not study for and gain a masters or degree award in 1995-96.

Table 7 Qualifications in previous year for part-time home students

HEI attended	Qualification in previous year		No. of students	% of students
Same HEI	Masters		276	7%
	Degree	First	66	2%
		Upper second	122	3%
		Other	26	1%
	Total from same HEI		***490***	12%
Different HEI	Masters		204	5%
	Degree	First	39	1%
		Upper second	81	2%
		Other	36	1%
	Total from different HEI		***360***	9%
No masters/degree award in previous year			3,096	78%
All			**3,946**	100%

Progression paths through PhD programmes

34. We consider the following variations on the 'standard' pathway through a PhD programme:

- changing mode
- moving between institutions
- breaks in PhD programmes.

Changing mode

35. The ‘full-time’ and ‘part-time’ modes referred to in this report refer to the modes at the start of the programme. Tables 8 and 9 show the proportions and outcomes of students changing active modes during their PhD studies.

Table 8 Mode changes for PhD programme cohort

Mode switch?	Start mode					
	Full-time		Part-time		All	
	No. of students	%	No. of students	%	No. of students	%
No	11,147	82%	4,310	89%	15,457	83%
Yes	2,525	18%	541	11%	3,066	17%
Total	**13,672**	**100%**	**4,851**	**100%**	**18,523**	**100%**

Table 9 PhD completion by mode changes for PhD programme cohort

Start mode	During course	No. of students	% PhD completion	% PhD completion or active
FT	FT only	11,147	74%	82%
	FT to PT	2,525	58%	82%
All FT		***13,672***	***71%***	***82%***
PT	PT only	4,310	32%	60%
	PT to FT	541	54%	78%
All PT		***4,851***	***34%***	***62%***
All		**18,523**	**61%**	**77%**

36. Around one-fifth of students who started on a full-time PhD changed mode to part-time at some point during their studies. These students have a lower rate of PhD completion compared to those who remained full-time for the whole of their studies (58 per cent against 74 per cent). Conversely, part-time starters who decide to move to full-time during their studies increase their chance of completing a PhD.

Moving between institutions

37. Table 10 shows the numbers of students who move HEI during their PhD programmes. Four per cent of students entering full-time PhD programmes do so during the period of their PhD studies. The corresponding figure for students entering part-time programmes is slightly higher at 6 per cent.

Table 10 Institutional movement during PhD programme

HEI attended	Full-time		Part-time		All	
	No. of students	% of students	No. of students	% of students	No. of students	% of students
Single HEI	13,135	96%	4,580	94%	**17,715**	**96%**
Moves HEI	537	4%	271	6%	**808**	**4%**
All	**13,672**	**100%**	**4,851**	**100%**	**18,523**	**100%**

38. Table 11 shows the PhD completion of starters to full-time PhD programmes split by whether they moved HEI during their studies. It shows that 71 per cent of full-time students who remain at the same HEI complete a PhD within seven years. For those that do move HEI, the figure is lower (67 per cent).

Table 11 PhD completion by institutional movement for full-time starters

HEI attended	No. of students	% PhD completion	% PhD completion or active
Single HEI	13,135	71%	82%
Moves HEI	537	67%	89%
All	**13,672**	**71%**	**82%**

39. Table 12 provides the equivalent part-time figures to the full-time figures given in Table 11. Part-time students also show a lower rate of PhD completion for those that move HEI.

Table 12 PhD completion by institutional movement for part-time starters

HEI attended	No. of students	% PhD completion	% PhD completion or active
Single HEI	4,580	34%	61%
Moves HEI	271	30%	79%
All	**4,851**	**34%**	**62%**

Breaks in PhD programmes

40. The percentages of students completing set out above relate to an elapsed time of seven years. Not all students will have been pursuing their PhD programmes for the whole of this time. It is difficult to estimate the number of students who take short breaks, but we are reasonably confident in our identification of students who are inactive for an entire academic year, that is from the 1 August until the 31 July in the following year. In Table 13 we show the percentage of students who have been inactive for at least one academic year, and then resumed their PhD programme.

Table 13 Percentage students inactive one or more academic years and have resumed their PhD programme

Start mode	PhD award	Active	Not active	All
Full time	7%	20%	8%	**8%**
Part time	12%	22%	12%	**15%**
All	**8%**	**15%**	**10%**	**10%**

Outcomes of PhD programmes

41. We can classify the outcomes in relation to gaining a PhD award into three groups:

    a. Completed a PhD within the period.

    b. Not completed a PhD but still active on a PhD course at the end of the period.

    c. No PhD completed and not active on a PhD course at the end of the period.

We cannot be sure whether groups b or c will eventually complete a PhD. The longer the period we take, the closer our figures will be to the final distribution of outcomes, with all students classified as a or c.

42. Although we have defined the cohort of students as being on PhD programmes, some of these students will qualify with an MPhil, either on the way to a PhD or as the final qualification.

PhD award outcomes by mode of study

43. Table 14 shows the achievement of students depending on the mode of study at the start of their PhD programme. It shows that 71 per cent of students who began a full-time PhD programme complete a PhD within seven years. A further 11 per cent of these full-time starters are still active on a PhD programme after seven years, having yet to complete a PhD.

44. Table 14 also shows that those who start on part-time PhD programmes are less likely to complete a PhD within seven years (34 per cent). A further 28 per cent are active on PhD programmes without completing a PhD within seven years.

Table 14 PhD completion by starting mode of PhD programme

Start mode	PhD completion	Active	Not active	All	% PhD completion	% PhD completion or active
Full time	9,726	1,541	2,405	**13,672**	71%	82%
Part time	1,659	1,364	1,828	**4,851**	34%	62%
All	**11,385**	**2,905**	**4,233**	**18,523**	**61%**	**77%**

Gaining an MPhil award

45. Table 15 shows the percentage of students who gained an MPhil.

46. It shows that 3 per cent of full-time students who complete a PhD also gain an MPhil during their PhD studies. It also shows that 10 per cent of full-time PhD students who have not completed a PhD and are not still active in 2002-03, have gained an MPhil at some point during their non-successful PhD studies.

Table 15 MPhil award rates for students starting on a PhD course in 1996-97

Start mode	PhD award	Active	Not active	All
Full time	3%	8%	10%	**5%**
Part time	1%	2%	5%	**3%**
All	**3%**	**5%**	**8%**	**4%**

47. The distribution of MPhil awards leads to the percentage of students with 'at least' an MPhil award as shown in Table 16.

Table 16 PhD or MPhil award by starting mode of PhD programme

Start mode	PhD or MPhil award	Active no award	Not active	All	% PhD or MPhil award	% PhD or MPhil award or active
Full-time	10,092	1,416	2,164	**13,672**	74%	84%
Part-time	1,786	1,331	1,734	**4,851**	37%	64%
All	**11,878**	**2,747**	**3,898**	**18,523**	**64%**	**79%**

Time to PhD completion

48. A full-time Research Council PhD student who started their course in 1996-97 would normally have three years of funding to complete their PhD studies. Assuming no significant delay in their studies, they would be expected to submit their thesis for PhD assessment early in academic year 1999-2000. It would be usual for the PhD viva then to take place around two months later, with another month or so for corrections if the viva was successful. The student would be awarded their PhD by a Board of Studies (or equivalent) between January and April 2000. This is usually the completion date recorded on the HESA records. So under these conditions, we would record the PhD student completing their PhD within four years (September/December 1996 through to January/April 2000).

49. Figure 1 shows the distribution of the time to PhD completion for full-time Research Council students. It shows that around 36 per cent of full-time Research Council students complete a PhD before 1 August 2000, having begun their studies in 1996-97 (in other words, within four years). It also shows that around 5 per cent of full-time students are not active on a PhD programme after 1 August 1997 having not completed a PhD. This figure rises to around 15 per cent by 1 August 2002.

50. Figure 2 provides the equivalent information for full-time students who do not receive Research Council funding. The pattern is broadly similar to Figure 1. However the proportion of inactive students is larger, especially towards the end of the period.

Figure 1 Time to PhD completion or last PhD activity for full-time Research Council students who began their studies in 1996-97

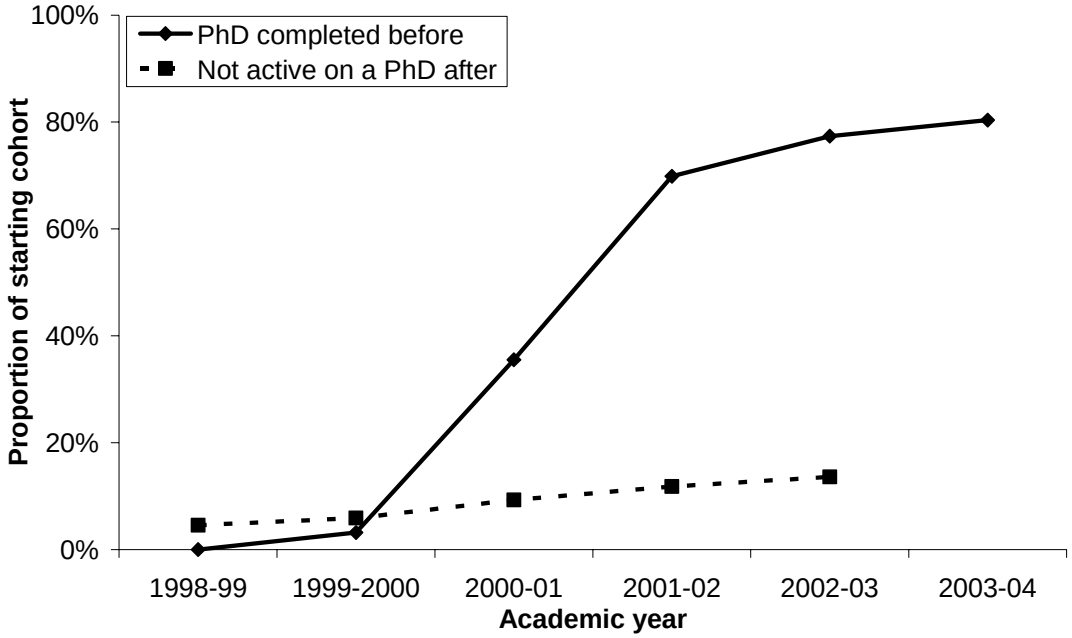


Figure 1 note: The value for 'not active on a PhD after' for 2003 is not given because no information is currently available on student activity after that date.

Figure 2 Time to PhD completion or last PhD activity for full-time non-Research Council students

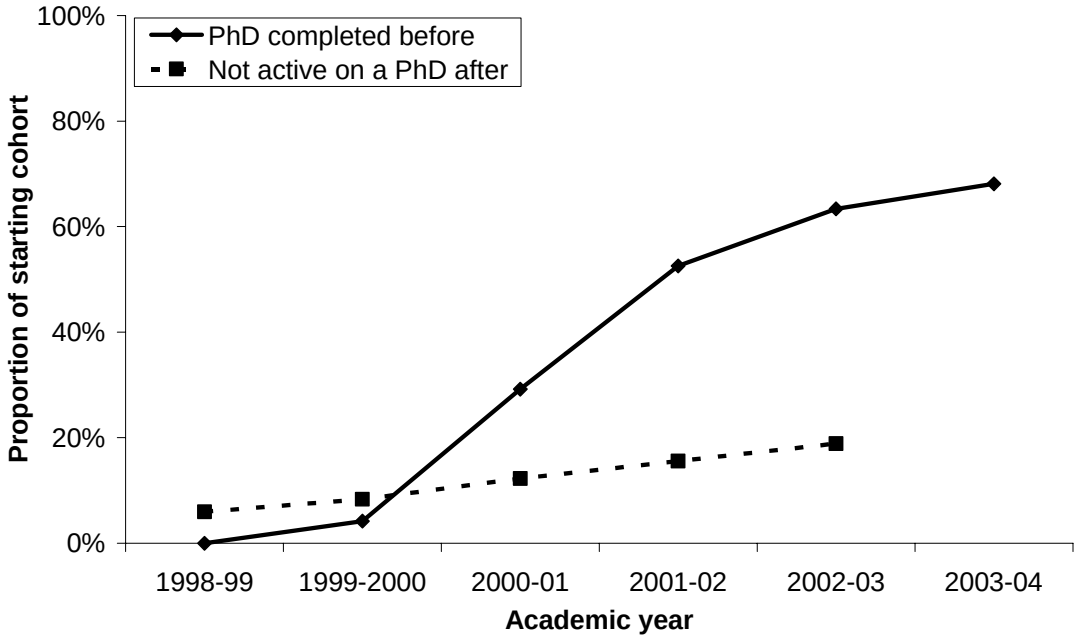


Figure 2 note: The value for 'not active on a PhD after' for 2003 is not given because no information is currently available on students after that date.

51. Figure 3 shows time to completion for PhD study for those on part-time programmes. It shows that a significant proportion of part-time students become inactive on PhD courses during the period examined. Around 15 per cent of the cohort has become inactive before 1 August 1998. This figure rises steadily to around 35 per cent by 1 August 2002.

Figure 3 Time to PhD completion or last PhD activity for part-time starters

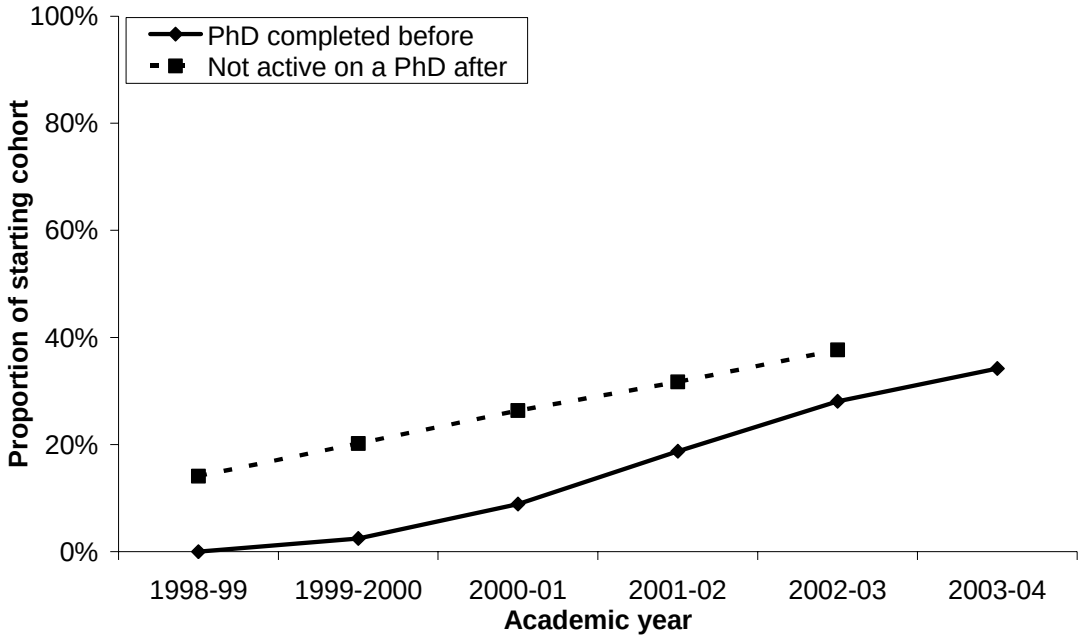


Figure 3 note: The value for 'not active on a PhD after' for 2003 is not given because no information is currently available on students after that date.

PhD completion rates by programme and student attributes

52. In this section we concentrate on whether a student completes the PhD programme or not after seven years. The effects of the following attributes on PhD completion rates are examined:

a. Source of student sponsorship.

b. Domicile of student.

c. Sex.

d. Age on entry.

e. Previous qualifications and route to PhD programme.

f. Subject area.

g. Institution and subject area within institution.

For each attribute ‘a’ to ‘f’ simple summaries are presented in paragraphs 59-97. Because part-time students cannot be expected to finish in the same time as full-time students, the summaries are shown by mode.

53. In addition to the simple summaries provided, the propensity to complete a PhD has been modelled, allowing the effect of different characteristics to be isolated and identified. Using this approach we can see, for example, if any differences between males and females can be explained by the different subject areas of their research programmes. This is described more fully below.

Propensity models

54. Separate models are used for students starting on full-time and part-time programmes. The results of the models are illustrated by the effect of modifying an attribute to a particular value (called the reference category) for all of the population. There is no particular significance as to which group is allocated as the reference category, but for ease, we chose the group with the largest number of students when the whole cohort is considered. The reference category is therefore the same for the full and part-time results. The reference category used for each characteristic can be identified by the label ‘ref.’ in the model column of the appropriate table.

55. For example, to examine the effect of student sponsorship, we change the sponsorship of all students in the dataset to having ‘no financial backing’ and then calculate what the PhD completion rate would have been if all students had no financial backing. A fuller explanation is provided in paragraphs 62-64.

56. In general, the effect of changing an attribute will be in the same direction for all students with a particular attribute. That is, the effect will be to increase the probability of completing, or decrease the probability of completing, for all students in the dataset. In some cases, however, the effect of a particular attribute is dependent on other factors, so that changing the attribute can increase the probability of completing for some students, and decrease for others. Such differences are not apparent from the overall average effect of such changes. We have therefore provided an additional statistic, the ‘consistency’, which shows the percentage of the students whose probability of completing increases with the change in the attribute.

57. Finally, note that this approach to presenting the results of the modelling can produce combinations of personal characteristics that rarely or never appeared in the original data. Care therefore needs to taken when interpreting the model results.

58. Full specifications for both the full- and part- time models are given in Annex C.

Source of student sponsorship

59. Table 17 shows the sources of sponsorship. The most common sources of sponsorship for students starting on full-time PhD programmes are the Research Councils.

For students starting on part-time PhD courses very few have Research Council sponsorship and the majority (58 per cent) have no financial backing at all.

Table 17 Source of student sponsorship

Source of sponsorship	Full-time		Part-time		All	
	No. of students	% of students	No. of students	% of students	No. of students	% of students
Research Council	3,381	25%	29	1%	**3,410**	**18%**
Charity/British Academy	768	6%	50	1%	**818**	**4%**
Institution	2,130	16%	617	13%	**2,747**	**15%**
Government	622	5%	243	5%	**865**	**5%**
UK industry	860	6%	587	12%	**1,447**	**8%**
Overseas	2,046	15%	69	1%	**2,115**	**11%**
Other	821	6%	450	9%	**1,271**	**7%**
No financial backing	3,044	22%	2,806	58%	**5,850**	**32%**
All	**13,672**	**100%**	**4,851**	**100%**	**18,523**	**100%**

60. Table 18 shows the rates of PhD completion for those students who started on a full-time PhD course in 1996-97 for each of the sources of student sponsorship. It shows that those funded by the Research Councils and charities have the best completion rates (80 per cent). Those with no financial backing have much lower rates, with 59 per cent completing a PhD within seven years: this is 21 percentage points less than for those with Research Council sponsorship.

Table 18 PhD completion by source of funding for full-time students

Source of sponsorship	No. of students	Actual		Model	
		% PhD award or active	% PhD award	Relative % PhD award	Consistency (% higher)
Research Council	3,381	86%	80%	10%	0%
Charity/British Academy	768	89%	80%	15%	0%
Institution	2,130	82%	72%	8%	0%
Government	622	82%	74%	10%	4%
UK industry	860	78%	67%	9%	0%
Overseas	2,046	86%	75%	10%	8%
Other	821	73%	59%	4%	4%
No financial backing	3,044	79%	59%	ref.	ref.
All	**13,672**	**82%**	**71%**	**n/a**	**n/a**

61. The model for those who began their studies on full-time PhD courses shows that there is a significant variation in PhD completion rates depending on a student's source of funding. The size and significance of the effect is dependent on the student's domicile, qualifications in the year prior to entry, and the student's age on entry to the PhD programme. The outputs from this model are presented using two statistics: the 'Relative % PhD award' rate and the 'Consistency' percentage.

Relative % PhD award rate

62. The students receiving Research Council sponsorship differ from those with no financial backing in a variety of other ways. For example, they are more likely to have a first if they graduated with a degree in the year before commencing PhD study. The relative % PhD award rate of 10 per cent for Research Council sponsored students shows that, taking into account all the other factors in the model, these students are still 10 percentage points more likely to complete than students with no financial backing. All the relative rates for different sources of student sponsorship are relative to those with no financial backing.

63. The relative rates are calculated as follows. The source of sponsorship is changed to 'no financial backing' for all full-time students and the expected completion rates are calculated and summarised. For Research Council sponsored students this gives an expected completion rate of 70 per cent. Students with no financial backing are, of course, unchanged with 59 per cent. The difference between of 21 percentage points (80% - 59%) between those without financial backing and those with Research Council can now be divided into two parts. Part of this difference (70% - 59% = 11%) is due to differing profiles of students who gain Research Council sponsorship compared to those with no financial backing. The remaining difference of 10 percentage points (21% - 11%) is due to other differences between the two groups. This could be other factors we have not measured, or, the direct result of receiving Research Council sponsorship. This is what is referred to as the 'relative % PhD completion' rate.

Consistency percentage

64. The consistency shows the proportion of the group that would have higher expected completion rates if they had been in the reference category. In the example given in paragraphs 62-63, 0 per cent of Research Council students would have higher expected completion rates if they had received no financial backing.

Table 19 PhD completion by source of funding for part-time students

Source of sponsorship	No. of students	Actual		Model	
		% PhD award or active	% PhD award	Relative % PhD award	Consistency (% higher)
Research Council	29	72%	55%	23%	0%
Charity / British Academy	50	68%	48%	5%	0%
Institution	617	62%	38%	-1%	67%
Government	243	61%	38%	4%	0%
UK industry	587	53%	27%	-5%	85%
Overseas	69	88%	61%	22%	0%
Other	450	57%	28%	-6%	98%
No financial backing	2,806	65%	34%	ref.	ref.
All	**4,851**	**62%**	**34%**	**n/a**	**n/a**

65. Table 19 is the equivalent table to Table 18 for those starting on part-time courses in 1996-97 rather than full-time ones.

66. The part-time pattern of PhD completion rates is broadly the same as for full-time rates, with the highest achievement rates recorded for the small number of part-time students funded by the Research Councils, or student with overseas backing. The largest group of part-time students are those with no financial backing who have a low rate of PhD completions, 34 per cent.

67. The modelling shows that for part-time course starters, there are significant differences in the PhD completion rates depending on source of funding. The size and significance of this effect varies by sex, domicile, previous entry qualifications and age of student.

68. The model provides rates relative to those with no financial backing. The results show, for example, students with funding from the institution are one percentage point less likely to complete than those with no financial backing, when other factors have been taken into account.

Domicile of students

69. Table 20 shows the geographical distribution of the students. It shows that the majority of PhD students studying in the UK are home-domiciled, but there are significant numbers coming from both European Union (EU) and non-EU countries. Around 80 per cent of part-time PhD students are home-domiciled, while around 60 per cent of full-time students are home-domiciled.

Table 20 Domicile of PhD students

Domicile	Full-time		Part-time		All	
	No. of students	% of students	No. of students	% of students	No. of students	% of students
Home	8,153	60%	3,946	81%	**12,099**	**65%**
EU	1,619	12%	316	7%	**1,935**	**10%**
Non-EU	3,900	29%	589	12%	**4,489**	**24%**
All	**13,672**	**100%**	**4,851**	**100%**	**18,523**	**100%**

70. Table 21 shows the rates of PhD completion for starters of full-time PhD programmes split by the student's domicile. The PhD completion rate for full-time students is around 70-72 per cent for all three domicile types. The lowest completion rates are associated with students from non-EU countries.

71. The actual completion rate for non-EU students is a little lower than for home students, according to the modelling for full-time students. However, when the other factors we have included into our modelling are taken into account, non-EU students and, to a lesser extent, EU students have a higher relative completion rate than home students.

Table 21 PhD completion by domicile for full-time students

Domicile	No. of students	Actual		Model	
		% PhD award or active	% PhD award	Relative % PhD award	Consistency (% higher)
Home	8,153	82%	72%	ref.	ref.
EU	1,619	84%	72%	6%	18%
Non-EU	3,900	83%	70%	8%	6%
All	**13,672**	**82%**	**71%**	**n/a**	**n/a**

72. Table 22 shows the information given in Table 21 but for starters to part-time PhD programmes. It shows that non-EU students have the highest rates of PhD completion or are still active on a PhD course for part-time students. 71 per cent of non-EU part-time PhD students are still active on a PhD course in 2002-03, or have completed a PhD seven years after starting. Home-domiciled part-time students have the lowest PhD completion rates, and the lowest PhD completion or still active rates.

73. The part-time modelling shows that there are significant effects of a student's domicile which is dependent on sex, source of funding and subject area of study of the student. As with full-time students, the modelling shows that Non-EU and EU have higher relative rates of completion after taking into account other factors.

Table 22 PhD completion by domicile for part-time students

Domicile	No. of students	Actual		Model	
		% PhD award or active	% PhD award	Relative % PhD award	Consistency (% higher)
Home	3,946	61%	33%	ref.	ref.
EU	316	66%	40%	4%	18%
Non-EU	589	71%	40%	6%	0%
All	**4,851**	**62%**	**34%**	**n/a**	**n/a**

Sex

74. There are differences in the completion rates for male and female students, both full and part-time, and for observed differences and differences after allowing for other factors. However, these differences are small. The details are provided below.

75. Table 23 shows the sex profile of PhD students split by starting mode of the programme. It shows that for both full- and part-time programmes, the majority are male students, with the highest proportion of males found for full-time students.

Table 23 Sex of PhD students

Sex	Full-time		Part-time		All	
	No. of students	% of students	No. of students	% of students	No. of students	% of students
Male	8,480	62%	2,725	56%	**11,205**	**60%**
Female	5,192	38%	2,126	44%	**7,318**	**40%**
All	**13,672**	**100%**	**4,851**	**100%**	**18,523**	**100%**

76. Table 24 shows the PhD completion rates for males and females who began their PhD studies on full-time programmes. It shows that for this type of programme, males have a higher rate of PhD completion (72 per cent compared to 70 per cent for females).

77. The modelling for full-time students shows that the effect of sex varies significantly depending on subject area of study and domicile of the student. The relative PhD award of minus 1 per cent for females shows that they still have a slightly lower completion rate when other factors are taken into account. This effect is consistent for all females.

Table 24 PhD completion by sex for full-time students

Sex	No. of students	Actual		Model	
		% PhD award or active	% PhD award	Relative % PhD award	Consistency (% higher)
Male	8,480	82%	72%	ref.	ref.
Female	5,192	83%	70%	-1%	100%
All	**13,672**	**82%**	**71%**	n/a	n/a

78. Table 25 shows the PhD completion rates by sex for those who began their PhD studies on part-time programmes. The completion rate pattern is reversed in comparison to those starting on full-time courses. The completion rate for females is higher than the equivalent rate for males (35 per cent compared to 34 per cent).

79. The modelling for part-time students shows that the effect of sex varies significantly depending on age, source of funding, subject area of study, and domicile of the student. The model results show that the higher completion rate for part-time females is in part explained by other factors, and that this overall effect is not consistent for all females. 41 per cent would have higher expected completion rates if their sex is changed to male.

Table 25 PhD completion by sex for part-time students

Sex	No. of students	Actual		Model	
		% PhD award or active	% PhD award	Relative % PhD award	Consistency (% higher)
Male	2,725	62%	34%	ref.	ref.
Female	2,126	63%	35%	1%	41%
All	**4,851**	**62%**	**34%**	n/a	n/a

Age on entry

80. Tables 26, 27 and 28 show the age profiles of PhD students and the completion rates for three age bands. We see that part-time study has a much higher proportion of older students. Older students have lower completion rates on both full- and part-time programmes. Note that the age is modelled as a continuous variable, so there is no age group reference category. The relative completion rates are derived by setting the age on entry for all students to 23, the modal age of entry.

Table 26 Age on entry of PhD students

Age group	Full-time		Part-time		All	
	No. of students	% of students	No. of students	% of students	No. of students	% of students
Under 25	5,995	44%	458	9%	**6,453**	**35%**
25 to 29	3,928	29%	929	19%	**4,857**	**26%**
Over 30	3,749	27%	3,464	71%	**7,213**	**39%**
Total	**13,672**	**100%**	**4,851**	**100%**	**18,523**	**100%**

Table 27 PhD completion by age on entry for full-time students

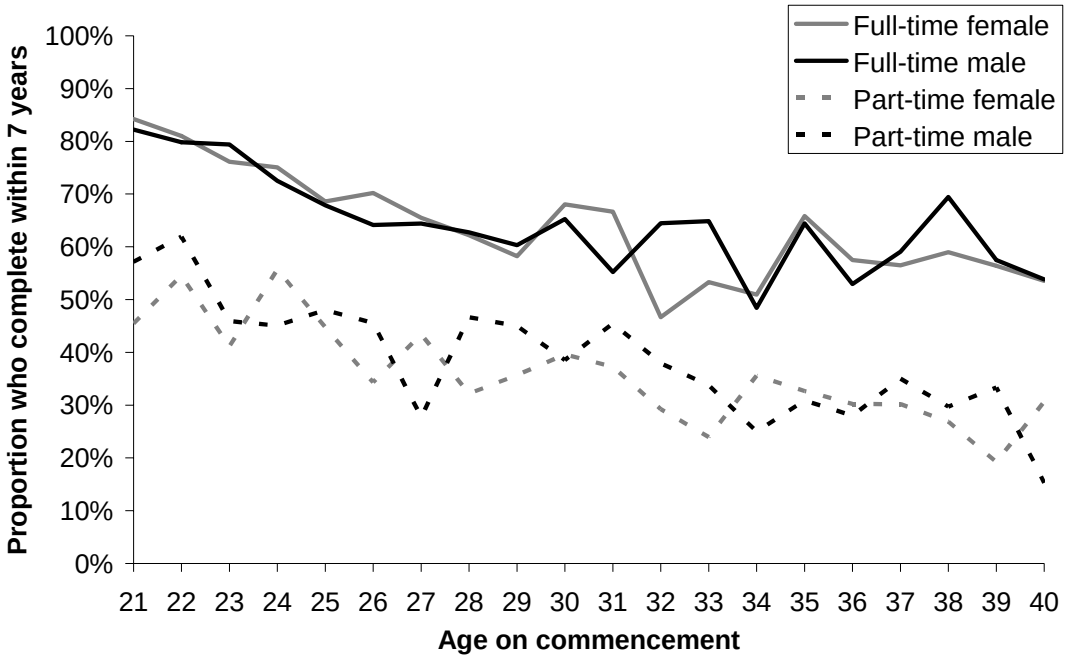
Age group	No. of students	Actual		Model	
		% PhD award or active	% PhD award	Relative % PhD award	Consistency (% higher)
Under 25	5,995	85%	78%	1%	24%
25 to 29	3,928	82%	69%	-4%	93%
Over 30	3,749	78%	62%	-8%	94%
Total	**13,672**	**82%**	**71%**	**n/a**	**n/a**

Table 28 PhD completion by age on entry for part-time students

Age group	No. of students	Actual		Model	
		% PhD award or active	% PhD award	Relative % PhD award	Consistency (% higher)
Under 25	501	63%	48%	0%	34%
25 to 29	929	66%	41%	-6%	87%
Over 30	3,421	61%	30%	-11%	86%
Total	**4,851**	**62%**	**34%**	**n/a**	**n/a**

81. Figure 4 shows the variation in seven-year PhD completion rates by sex and age. This further demonstrates the negative association between age and rates of PhD completion. For both part-time and full-time starters younger starters have higher rates of completion.

Figure 4 PhD completion rates by age and sex



82. Both the full- and part- time models show that age has a significant effect on PhD completion rates. As in Figure 4, the modelling indicates that for younger people there is a decreasing probability of completion as the age on commencement increases. It also shows that the effect of age on completion rates is reduced for those beyond around the age of 30.

Previous qualifications and route to PhD programme

83. The numbers and percentages of students taking different entry routes are shown in Tables 4 to 7. Table 29 shows the PhD completion rates for all full-time students in the cohort split by their route to their PhD programme and, if they qualified in the previous year, the nature of that qualification. First degrees are divided into first class honours and 'other', and are distinguished from masters degrees.

84. The pattern of actual completion rates across these categories is complex. Those with firsts do best, whether from the same or different HEI. The rates for masters and other classes of first degree are equal from the same HEI, while from a different HEI the masters students have the lowest completion rates, including those who did not qualify in the previous year.

85. The modelling for all full-time students shows that PhD completion rates vary significantly by previous study of the student. The size and significance of the effect varies by subject area of study, source of funding, domicile and age of student. This modelling suggests that, even after allowing for other factors, students with firsts have the highest completion rates. Those with other classes of first degree have the lowest relative PhD award rate. It is hard to differentiate those with masters from those without an award in the previous year, because of both the varying relative PhD award rates, and the consistency values.

Table 29 PhD completion by previous study for full-time students

HEI attended	Qualification in previous year		No. of students	Actual		Model	
				% PhD award or active	% PhD award	Relative % PhD award	Consistency (% higher)
Same HEI	Masters		1,189	84%	70%	2%	47%
	Degree	First	1,110	87%	81%	4%	5%
		Upper second / other	1,255	81%	70%	-4%	100%
	Total from same HEI		***3,554***	***84%***	***73%***	***n/a***	n/a
Different HEI	Masters		860	80%	67%	-1%	74%
	Degree	First	692	89%	82%	3%	18%
		Upper second / other	1,039	83%	75%	-3%	100%
	Total from different HEI		***2,591***	***84%***	***74%***	***n/a***	n/a
No masters/degree award			7,527	81%	69%	ref.	ref.
All			**13,672**	**82%**	**71%**	**n/a**	n/a

86. Table 27 shows PhD completion rates for all part-time students split by their qualification gained in 1995-96.

87. More than three-quarters of part-time students did not graduate in the previous year, so the numbers of students with different qualifications from the same and different HEIs are relatively small. However, the actual figures do suggest that, as for full-time students, students with a first class degree are at an advantage, with the other categories forming no simple pattern.

88. The part-time model for the whole data shows that the effect of previous study qualifications varies by subject area of study, source of student funding and the age of the student. The directions of the effects are consistent for all classes of qualification (for example, all students who gained a masters in the previous year have higher expected achievement compared to those with no award) except for those who have a first class degree from a different institution (that is, some are expected to have higher achievement and so are not).

89. The results of the modelling suggest that, after taking other factors into account, having a first is associated with the highest completion rates, though for students from a different HEI this effect is not consistent. Students with masters have lower relative PhD completion rates, with the lowest rates associated with those with other classes of degree and with no qualification in the previous year.

Table 30 PhD completion by previous study for part-time students

HEI attended	Qualification in previous year		No. of students	Actual		Model	
				% PhD award or active	% PhD award	Relative % PhD award	Consistency (% higher)
Same HEI	Masters		346	66%	38%	6%	0%
	Degree	First	69	65%	49%	13%	0%
		Upper second / other	162	50%	31%	-2%	96%
	Total from same HEI		***577***	***61%***	***38%***	***n/a***	n/a
Different HEI	Masters		236	68%	39%	7%	0%
	Degree	First	42	74%	55%	9%	33%
		Upper second /other	120	60%	42%	1%	0%
	Total from different HEI		***398***	***66%***	***41%***	***n/a***	n/a
No masters/degree award			3,876	62%	33%	ref.	ref.
All			**4,851**	**62%**	**34%**	**n/a**	n/a

Subject

90. Table 28 shows the number of PhD students in each subject split by mode for 1996-97. The highest concentration of full-time PhD students is seen in the biological and physical sciences, and engineering. For part-time students, medical and veterinary sciences and combined subjects have the highest numbers of PhD students.

Table 31 Subject area of study for PhD programmes

Subject	Full-time		Part-time		All	
	No. of students	% of students	No. of students	% of students	No. of students	% of students
Medicine/veterinary	906	7%	565	12%	**1,471**	**8%**
Allied to medicine	596	4%	256	5%	**852**	**5%**
Biological sciences	1,965	14%	409	8%	**2,374**	**13%**
Physical sciences	2,329	17%	218	4%	**2,547**	**14%**
Engineering	2,224	16%	436	9%	**2,660**	**14%**
Mathematics	437	3%	52	1%	**489**	**3%**
Computing	421	3%	117	2%	**538**	**3%**
Agriculture	268	2%	46	1%	**314**	**2%**
Architecture	179	1%	106	2%	**285**	**2%**
Business	458	3%	345	7%	**803**	**4%**
Social studies	1,228	9%	543	11%	**1,771**	**10%**
Languages	858	6%	333	7%	**1,191**	**6%**
Humanities	806	6%	321	7%	**1,127**	**6%**
Education	313	2%	658	14%	**971**	**5%**
Creative arts	174	1%	145	3%	**319**	**2%**
Law/librarianship	299	2%	132	3%	**431**	**2%**
Combined	211	2%	169	3%	**380**	**2%**
All	**13,672**	**100%**	**4,851**	**100%**	**18,523**	**100%**

91. Table 29 shows the rate of PhD completion for students who started on a full-time PhD programme split by their initial subject area of study. It shows that biological and physical sciences have the highest rates of completion, with 81 per cent of these students achieving a PhD within seven years. The lowest seven-year rate of completion is seen in architecture, with 54 per cent of the 179 students completing a PhD within the period.

92. The full-time model shows that PhD rates are significantly affected by subject area of the PhD. The size and significance of these effects change depending on the sex, prior entry qualifications and age of the student.

93. The relative PhD award rates suggest that, in general, other factors cannot explain the differences in subject completion rates. The low rates for architecture, business, social studies and other humanities seem to be due in part to other factors, but not entirely.

Table 32 PhD completion by subject area for full-time students

Subject	No. of students	Actual		Model	
		% PhD award or active	% PhD award	Relative % PhD award	Consistency (% higher)
Medicine/veterinary	906	82%	76%	8%	3%
Allied to medicine	596	86%	76%	7%	9%
Biological sciences	1,965	87%	81%	11%	0%
Physical sciences	2,329	86%	81%	8%	1%
Engineering	2,224	80%	70%	ref.	ref.
Mathematics	437	83%	75%	5%	0%
Computing	421	74%	60%	-8%	100%
Agriculture	268	86%	77%	9%	0%
Architecture	179	78%	54%	-12%	100%
Business	458	72%	58%	0%	91%
Social studies	1,228	81%	61%	-4%	100%
Languages	858	82%	64%	-4%	71%
Humanities	806	81%	62%	-5%	100%
Education	313	82%	66%	0%	0%
Creative arts	174	75%	55%	-4%	100%
Law/librarianship	299	79%	56%	-10%	100%
Combined	211	78%	64%	5%	10%
All	**13,672**	**82%**	**71%**	**n/a**	**n/a**

94. Table 30 shows the rate of PhD completion for students who started on a part-time PhD programme split by their initial subject area of study. The highest part-time rates of completion are now seen in the medicine and veterinary sciences. The lowest part-time rates of completion are seen for computing students.

95. The part-time model shows that there are significant marginal subject area effects which can vary in size and significance depending on the sex, domicile, prior entry qualifications and age of the student.

96. The direction of the effect of changing students to studying engineering is relatively consistent within subject area student groups. However, although the model indicates that, on average, students studying for creative arts would have higher expected rates of completion if they are changed to studying engineering instead, 32 per cent of them (100 – 68 per cent) would have lower expected completion rates.

97. The relative PhD award rates suggest that other factors are playing a bigger part than was the case for full-time students. When we take account of the other factors included in the modelling, the groupings of subjects for part-time students moves closer to that for full-time students, with the natural sciences having higher relative rates. These subject groupings are discussed further at paragraphs 116 to 120 below.

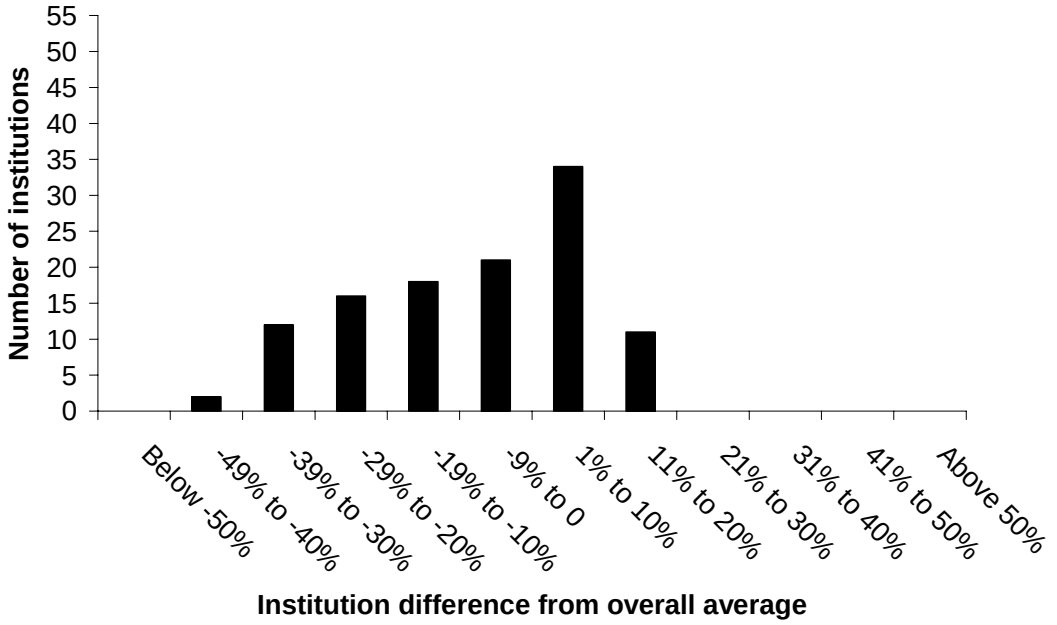
Table 33 PhD completion by subject area for part-time students

Subject	No. of students	Actual		Model	
		% PhD award or active	% PhD award	Relative % PhD award	Consistency (% higher)
Medicine/veterinary	565	71%	53%	16%	0%
Allied to medicine	256	60%	34%	1%	0%
Biological sciences	409	61%	41%	4%	21%
Physical sciences	218	63%	38%	0%	89%
Engineering	436	64%	42%	ref.	ref.
Mathematics	52	69%	31%	-4%	90%
Computing	117	50%	23%	-12%	100%
Agriculture	46	76%	48%	4%	0%
Architecture	106	53%	22%	-11%	100%
Business	345	57%	28%	-4%	100%
Social studies	543	62%	29%	-7%	100%
Languages	333	65%	30%	-10%	100%
Humanities	321	64%	28%	-8%	97%
Education	658	62%	28%	-5%	94%
Creative arts	145	61%	33%	-4%	68%
Law/librarianship	132	60%	26%	-9%	69%
Combined	169	53%	25%	-8%	82%
All	**4,851**	**62%**	**34%**	**n/a**	**n/a**

Institutions and subject areas within institutions

98. Figure 5 shows the variation from the average institutional proportion of students achieving a PhD within seven years, having started on a full-time course in 1996-97 (71 per cent). Some institutions have rates that are nearly 50 per cent lower than the overall average. (Note that Figures 5 to 8 exclude institutions with less than 10 students.)

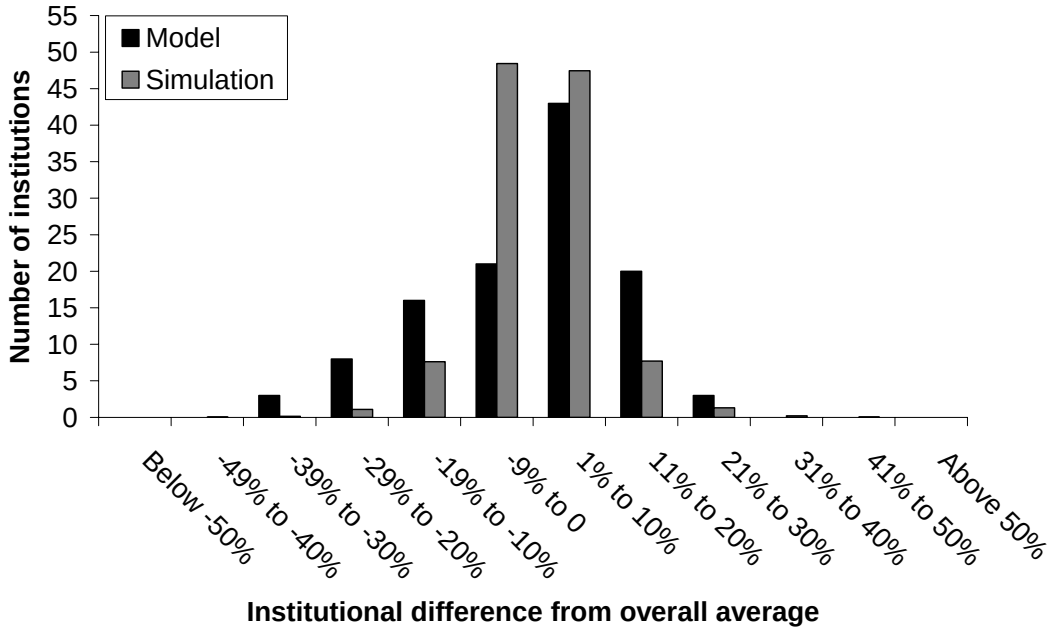
Figure 5 Institutional variations in rates of PhD completions within seven years for full-time starters



99. Some of the variation in Figure 5 can be explained through the characteristics of the students attending each institution. For example, an institution may have a particularly high rate of PhD completion in comparison to the sector-wide average because that institution has a higher than normal proportion of Research Council students. Some variation is due to the expected random variation that will occur from year to year. However, the modelling shows that not all the variation in institutional rates can be explained through student characteristics or random variations: it shows that there are significant differences both between institutions, and between subject areas within institutions.

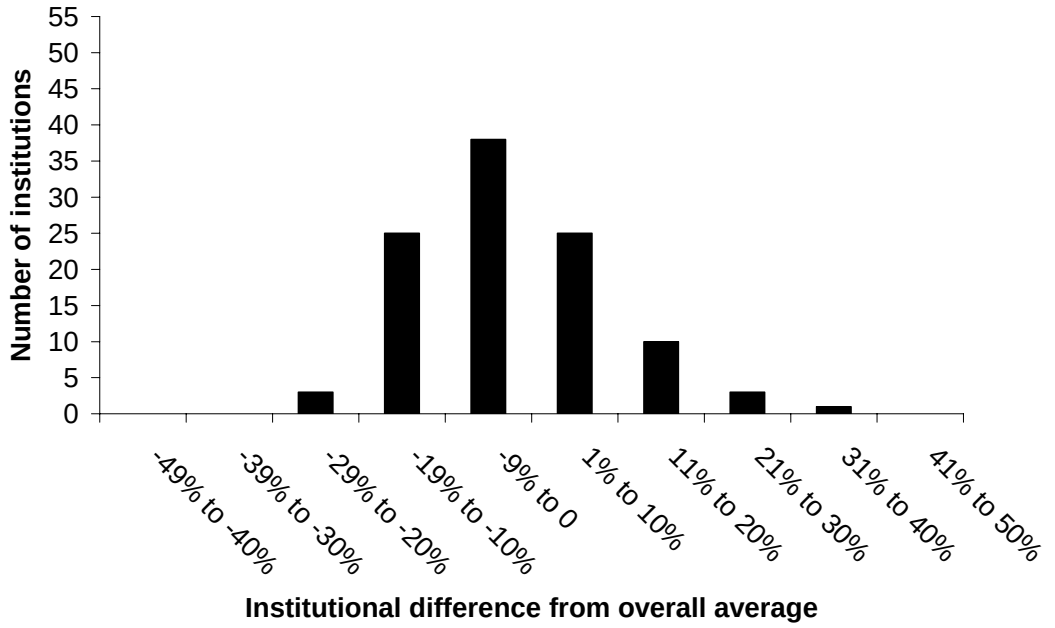
100. Figure 6 shows the actual variation in institutional rates after adjusting for the characteristics of full-time students at each institution. For comparison, the variation we would expect to find were each institution to have the same underlying completion rates given the characteristics of its students and programmes has been simulated. The actual institutional variation is somewhat greater than that from the simulation, as was demonstrated through the modelling. This suggests that there are other factors differentiating institutions which are associated with completion that we have not examined.

Figure 6 Variation in institutional rates after adjusting for other factors for actual and simulated data



101. Figure 7 shows the same data as Figure 5 but for students who started on a part-time course in 1996-97; the average institutional proportion of such students achieving a PhD within seven years is 34 per cent.

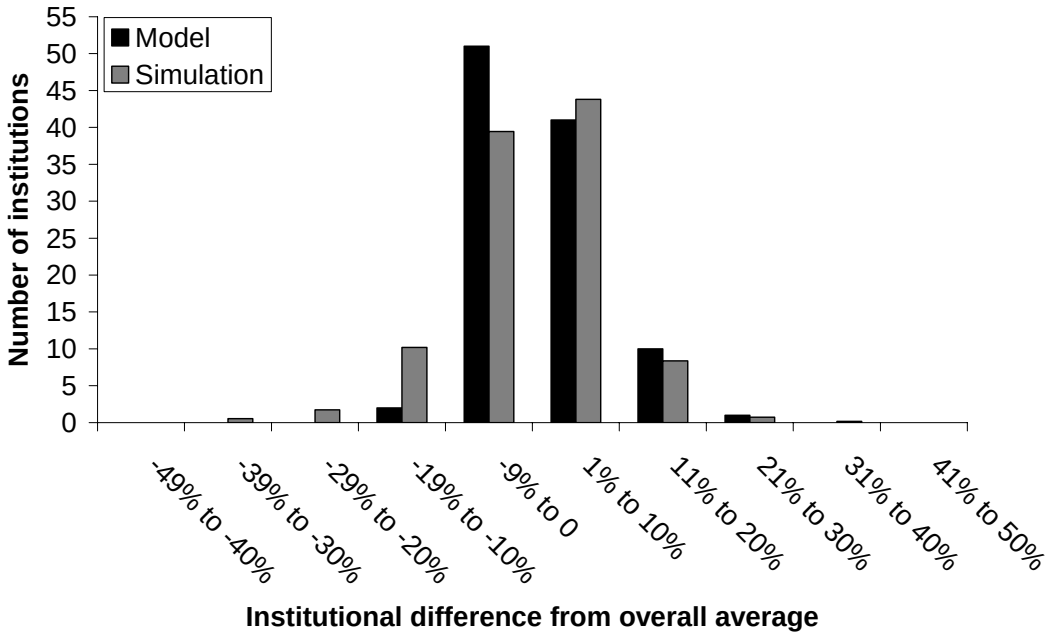
Figure 7 Institutional variations in rates of PhD completions within seven years for part-time starters



102. As with the students who began their PhD studies on full-time courses, some institutional variation can be explained through the characteristics of students at the

institution, and some is due to random variation. Though the modelling shows some unexplained variation between institutions, and variation between subjects within institutions, Figure 8 suggests that this remaining variation in institutional rates (after adjusting for the characteristics of part-time students at each institution) is not materially different from what we would expect by chance.

Figure 8 Variations in institutional rates after adjusting for other factors for actual and simulated data



Comparisons with submission rates published by OST

103. The Research Councils collect thesis submission rates four and five years after starting for students in receipt of the awards they provide. It has been estimated that, at least for students researching in engineering and the physical sciences, half the students complete within 15 to 17 weeks of submitting and about 97 per cent within a year.[5]

104. For the nearest cohorts to those described in this study, the four-year submission rate calculated by Research Councils is about 75 per cent. Comparing this figure with the completion rates reported here is difficult. Awards made in, say, October, will usually be reported in the HESA record returned in the following year; though, clearly, some of the awards reported in the fifth year will relate to students who submitted after four years, and therefore would not be included in the Research Council submission figures. The five-year completion rate of 70 per cent for Research Council supported students reported here (see Figure 1) is about what we would expect if we assume that this refers to all those students submitting within four years and gaining an award within five. In addition to the difficulties comparing the timescales of submission and award, we would not expect the two figures to align exactly for a number of other reasons. These include data inaccuracies in either source

[5] Personal communication from Iain Cameron of EPSRC.

and differences in definitions of the cohort included, and in what constitute 'successes'. For example, some students are excluded from the Research Council figures because of illness, and some, but not all, Research Councils include students who submit for an MSc within a certain time period.

Discussion and conclusions

Overall completion rates

105. We have found that over seven years – the longest period we can safely use with currently available data – 71 per cent of full-time and 34 per cent of part-time students have completed their PhD. If all the students who are active at the end of the seven years went on to complete at some future date, we would end up with 82 per cent and 62 per cent respectively. Given it is possible that some students who are currently inactive may resume their programmes, these are not the highest rates that are theoretically possible. However, they almost certainly represent an overestimate of the eventual completion rate. Our best estimates of the 'eventual' completion rate are therefore in the ranges 71 to 82 per cent, and 34 to 62 per cent for full-time and part-time respectively.

106. These estimates are likely to be slightly low. We know from our investigations of undergraduate progression that data errors are more likely to deflate rather than inflate completion rates. HESA goes to great lengths to quality assure the data submissions from institutions, but it is impossible to ensure that every 'qualification obtained' is returned. It is likely that when HEFCE introduces PhD completion monitoring, the data will receive more attention and data quality will improve, leading to a small apparent increase in completion rates. Such 'improvements' are unlikely to be more than one or two percentage points.

107. Should these figures be cause for congratulation or concern? In part this depends on whether an uncompleted PhD programme is judged to be of value. This will vary from individual to individual. What is clear is that starting a part-time PhD is a high-risk venture: we can estimate that only one in three students is likely to submit a thesis within six years.

108. Making meaningful international comparisons from currently available sources is not possible[6] and comparisons with another country or countries would be a project in itself, so it is difficult to know whether the UK HE sector is doing better or worse than higher education in other countries.

[6] The OECD has attempted to assemble comparative statistics. See 'Education at a Glance', OECD (2004), page 70, Table A3.2, 'Advanced research programmes'. However, full definitions are not provided and figures are only provided for six countries, excluding UK and the US. There are individual studies on completion rates for particular groups of students in the US and elsewhere, but it would be unwise to compare the figures with those reported here.

Factors associated with completion

109. The relationships between the factors examined and completion are similar to what we might expect. In general this is the case for both the simple observed average figures, and for comparisons on a like-for-like basis when in each factor considered separately. The findings are provided below.

Student sponsorship

110. It is unsurprising that students with no financial support, or whose support is described as 'other', are shown to be less likely to complete, using the observed data and after allowing for other factors. In part this is, no doubt, due to financial difficulties. But another factor is that students gaining sponsorship from, say, the Research Councils, charities or the British Academy will have involved some competition, so these students may be in a better position in other ways which are not captured with the data available.

Overseas sponsorship and overseas students

111. Students with overseas sponsorship have high rates of completion, as do the larger numbers who come from overseas with a variety of forms of financial backing. These results are found for both the observed summaries and for the 'like for like' comparisons from the modelling. This is consistent with a high degree of commitment, which we might expect from overseas students, but also with effective selection procedures by the UK universities.

Age and sex

112. The completion rates for men and women are very similar, both as observed and after taking into account of other factors. This contrasts with undergraduate programmes, where men have lower completion rates.[7]

113. The decreasing rate of completion with age, both as observed and after taking into account of other factors, does follow the pattern found for undergraduate study[11]. This result is unsurprising, given the increased commitments that many mature students have.

[7] The higher non-completion rates for male undergraduate students are reported in HEFCE publications 'Schooling effects on higher education achievement'(HEFCE report 2003/32), and 'Young participation in higher education', (HEFCE report 2005/03). The higher non-completion rates for mature undergraduate students has been widely reported, and can be seen in the performance indicators published by the funding councils and HESA at www.hefce.ac.uk/pi/ and www.hesa.ac.uk/pi/.

Prior qualifications and routes to entry

114. When students have qualified in the previous year, after allowing for other factors, we find that students with a first class honours have higher completion rates than those with other classes of degree, and those with masters degrees are somewhere in between.

115. Though there are statistically significant differences between those progressing directly from a first degree or masters, at the same HEI or a different HEI, and those who did not qualify in the previous year, the differences are small and inconsistent. There is no simple pattern.

Subject

116. We can arrange the subjects into three groups as shown in Table 31.

Table 34 Relative completion rates for subject groupings (percentage points)

Subject grouping		Full-time	Part-time
Natural sciences and related subjects	Agriculture Biological sciences Mathematics Medical/veterinary Physical sciences	+5 to +11	-4 to +16
Social sciences and humanities	Humanities Creative arts Languages Social studies	-4 to -10	-4 to -10
'Vocational' subjects	Architecture Business Computing Engineering	-12 to 0	-12 to 0

117. 'Natural sciences and related subjects' all have well established research fields with largely agreed methodologies. Note that under 'Agriculture' much of the research is in soil science, food science and other subjects with a close connection with the physical and biological sciences. Typically, results from research in these fields are reported in learned journals. Most of the research fields in these subject areas are well established, and basic methodological disputes are rare. In these subjects, identifying topics and questions for PhD students is usually relatively straightforward. The only relative completion rate below the reference subject (engineering) is part-time mathematics, and there are just 52 students in this category.

118. Fields of research in 'Social sciences and humanities', are not always as well established as in the natural sciences, and methodologies may still be disputed. Sometimes

it may be difficult to identify topics which can yield substantial results through a PhD research programme. Completion rates for students on programmes in these subjects are not universally low, but when we take account of other factors we see that the 'subject effect' is negative compared to the natural sciences and related subjects.

119. Finally we have what have been described as the 'Vocational' subjects. Of course other subjects, in particular 'Medical/veterinary', are also vocational. However, all the subjects in this group have alternative careers to research within the same field, for which a student with a partly completed PhD could be well placed to enter.

120. We do not have evidence to back up this line of reasoning. However, it is consistent with the relative completion rates for the different subject areas that have been isolated through the modelling.

Mode of study

121. Part-time students take longer to complete as part of the nature of their course, but the findings also show that a much lower proportion will complete ever. This is, no doubt, in part due to the length of time taken, and the difficulties of juggling competing demands on time. But part-time students also have a number of other unfavourable factors. In Table 32 we summarise the main differences in full-time and part-time study in terms of factors which have been shown to have an association with completion rates.

Table 35 Characteristics of full-time and part-time students

Attribute	Full-time	Part-time
Financial backing	78%	42%
Overseas (including EU) students	40%	19%
Students aged 30 and under	73%	29%
First class honours (of those qualifying in the previous year)	39%	12%
Natural sciences and related subjects	48%	32%

122. These factors, along with the inherent difficulties of following a part-time programme, partially explain the low completion rates of part-time students. Using the part-time model, we can show that, were part-time students to have exactly the same profile as full-time students with respect to the other factors, the expected completion rate in seven years would be 53 per cent, as opposed to the actual 34 per cent part-time rate.

Variation in completion rates by institution

123. Much of the variation in full-time completion by institution – and, for practical purposes, all of the variation in part-time completion – can be explained by the differing aspects of students and programmes and the expected random variation. When HEFCE introduces a PhD completion monitoring programme, the cases of unexplained high non-completion will be identified, and subsequent investigations may provide further explanations.

Annex A
HESA student record data definitions

Data definitions

Starting cohort

1. The starting cohort for this study is made up of students who:

- commenced between 1 August 1996 and 31 July 1997 (HESA field 26 COMDATE between dates specified)
- started study in 1996-97 on a doctorate degree mainly by research, or masters degree mainly by research (Field 41 QUALAIM - codes '02' or '04'). This could include some specialist doctoral degrees, such as the Doctor of Education (EdD) and the Doctor of Engineering (EngD)
- are not studying on a doctorate degree mainly by research, or masters degree mainly by research at any point during 1 August 1995 and 31 July 1996
- are classified as starting on a full- or part-time course by using the classification given below
- do not finish their PhD studies with a PhD award within two years, or an MPhil award within 100 days
- must show evidence of being on PhD course at some point during the seven year period, meaning: the student completes a PhD within the period, or studying is on a PhD qualification aim at some point during the period
- have not left due to death or ill-health (Field RSNLEAVE 33 - codes '04' or '05')
- are active or writing-up in HE in at least one academic year after commencing.

All conditions must be met to be included in the starting cohort.

Mode

2. A student's mode in each year is defined by HESA field 70 (MODE) and is allocated as follows:

a. Full-time

- '01' Full time according to Funding Council definitions
- '02' Other full time
- '11' Full-time course/programme
- '21' Sandwich (thick)
- '22' Sandwich (thin)
- '23' Sandwich(thick) according to Funding Council definitions
- '24' Sandwich(thin) according to Funding Council definitions
- '25' Other sandwich course/programme

b. Part-time

- ‘31’ Part-time
- ‘38’ Structured part-time (institutions in Scotland)
- ‘39’ Other part-time (institutions in Scotland)

c. Writing up / dormant

- ‘41’ Writing up and requiring more than two hours/week of supervision
- ‘42’ Writing up and requiring less than two hours/week of supervision
- ‘43’ Writing up – previous full-time
- ‘44’ Writing up – previous part-time
- ‘51’ Sabbatical
- ‘52’ Optional year out – study related
- ‘61’ Compulsory year out – study related
- ‘63’ Dormant – previously full-time
- ‘64’ Dormant – previously part-time.

Qualification

3. The student’s highest qualification obtained during the period 1 August 1998 and 31 July 2002 is taken as their qualification state. This is derived from the HESA fields QUAL1 and QUAL2 (fields 37-38), and a PhD is deemed to have been completed if a code of ‘02’ (doctorate degree mainly by research) has been provided in one of these fields.

Source of funding

4. The student’s source of funding is derived from HESA field MSTUFEE (field 68) and is as follows:

a. Research Council
- ‘11’ Biotechnology & Biological Sciences Research Council
- ‘12’ Medical Research Council
- ‘13’ Natural Environmental Research Council
- ‘14’ Engineering & Physical Sciences Research Council
- ‘15’ Economic and Social Research Council
- ‘16’ Particle Physics & Astronomy Research Council
- ’17’ Arts & Humanities Research Funding Board
- ‘19’ Research Council, not specified

b. Charity / British Academy
- ‘08’ British Academy
- ‘21’ Charitable foundation
- ‘22’ International agency

c. Institution

- ‘05’ Institutional waiver of support costs
- ‘07’ Fee waiver under government unemployed students scheme
- ’98’ No fees

d. UK industry

- ‘61’ UK industry / commerce
- ‘81’ Student’s employer

e. Government

- ‘02’ Award assessed by English or Welsh LEA and paid in full by LEA or the Student Loans Company
- ‘03’ Paid in full by Student Awards Agency for Scotland
- ‘04’ Paid in full by DEL
- ‘31’ Department of health/regional health authority/Scottish Office home & health department
- ‘32’ Department of Social Services
- ‘33’ DfES
- ‘34’ Other HM government departments / public bodies
- ‘35’ Scholarship of HM forces
- ‘36’ Scottish Enterprise / Highlands & Islands Enterprise / Training Enterprise Council / Local Enterprise Company
- ‘37’ LEA training grants scheme
- ‘38’ Department of Agriculture & Rural Development
- ‘39’ Scottish Local Authority

f. No financial backing

- ‘01’ No award or financial backing

g. Overseas

- ‘41’ EU commission
- ‘42’ Overseas student award from HM government/British Council
- ‘43’ Overseas government
- ‘44’ Overseas Development Administration
- ‘45’ Overseas institution
- ‘46’ Overseas industry or commerce
- ‘47’ Other overseas funding
- ‘48’ Other overseas – repayable loan

h. Other

i. Any other code.

Domicile

5. Domicile is calculated using the HESA derived field flgdom3 (or xdomct01). This is based on academic year 1996-97:

a. Home student
- UK unknown
- Channel Islands
- Isle of Man
- England
- Wales
- Scotland
- Northern Ireland

b. EU student
- Geographical region – European Union

c. Non-EU student
- Geographical region – Africa
- Geographical region – Asia
- Geographical region – Australasia
- Geographical region – Middle East
- Geographical region – North America
- Geographical region – South America
- Geographical region – Other Europe
- Geographical region – Other overseas.

Age

6. A student's age is calculated on 1 August 1996.

Annex B
Outline of method used to link HESA student records

1. All students in a HESA individualised student record (year X) are matched to the following record (year X+1) using a number of match processes. The main approach to each matching process is given below (although in some other factors are taken into account):

   a. Records with matching HUSID, HESAINST and NUMHUS (HIN linked).

   b. Records matched on gender, birth date, first name and surname with restriction for common names and an allowance for maiden name changes and spelling errors.

   c. Records matched on HUSID and either postcode, birth date, surname or first name.

   d. Records matched on HESAINST, HUSID, gender and surname with potential spelling errors or maiden name changes.

   e. Records matched on birth date, gender and first part of postcode. A combination of first name, HUSID and second part of postcode are further used to eliminate/select potential matches.

2. These five matching processes are also used to internally match students up within a single academic year's HESA record. This internal matching is done for both year X and year X+1.

3. The identified matches are then resolved so that a single person identifier exists for year X and year X+1.

4. The process is repeated for matching between all pairs of years (for example, X+1 and X+2, X and X+2).

5. The final step is to resolve all found links across all the years to produce a single longitudinal identifier.

Annex C
PhD completion propensity models

Model – Students who began on a full-time PhD course in 1996-97

$$\text{phdaward}_{ijk} \sim \text{Binomial}(n_{ijk}, \pi_{ijk})$$

$$\begin{aligned}
\text{logit}(\pi_{ijk}) = {} & \beta_{0jk}\text{cons} + \text{-0.148(0.027)Age}_{ijk} + \text{0.002(0.000)Age.Age}_{ijk} + \text{0.034(0.054)Male}_{ijk} + \\
& \text{0.090(0.266)S_agrc}_{jk} + \text{1.597(0.475)S_amed}_{jk} + \text{-0.536(0.188)S_arch}_{jk} + \\
& \text{0.709(0.104)S_biol}_{jk} + \text{-0.062(0.137)S_busn}_{jk} + \text{0.376(0.206)S_comb}_{jk} + \\
& \text{-0.418(0.133)S_comp}_{jk} + \text{-0.205(0.193)S_cart}_{jk} + \text{0.019(0.166)S_ed}_{jk} + \\
& \text{-0.067(0.137)S_hum}_{jk} + \text{3.170(1.293)S_lang}_{jk} + \text{0.212(0.147)S_math}_{jk} + \\
& \text{0.578(0.159)S_med}_{jk} + \text{-0.474(0.153)S_ll}_{jk} + \text{1.300(0.300)S_phys}_{jk} + \\
& \text{-0.107(0.118)S_sstd}_{jk} + \text{0.762(0.111)R_char}_{ijk} + \text{1.745(0.460)R_govn}_{ijk} + \\
& \text{0.287(0.077)R_inst}_{ijk} + \text{-2.511(1.518)R_other}_{ijk} + \text{0.570(0.079)R_ovsa}_{ijk} + \\
& \text{0.560(0.078)R_resc}_{ijk} + \text{0.414(0.106)R_inds}_{ijk} + \text{0.502(0.083)D_eu}_{ijk} + \\
& \text{-2.668(0.764)D_nneu}_{ijk} + \text{-0.647(0.348)SMasters}_{ijk} + \text{-0.791(0.429)DMasters}_{ijk} + \\
& \text{0.278(0.094)SFirst}_{ijk} + \text{-0.382(0.214)DFirst}_{ijk} + \text{-0.221(0.084)SUpperOther}_{ijk} + \\
& \text{-0.191(0.092)DUpperOther}_{ijk} + \text{0.630(0.313)S_agrc.Male}_{ijk} + \text{-0.281(0.173)S_med.Male}_{ijk} + \\
& \text{-0.402(0.212)S_biol.D_eu}_{ijk} + \text{-1.037(0.496)S_comb.D_eu}_{ijk} + \\
& \text{-0.565(0.209)S_lang.D_eu}_{ijk} + \text{-0.508(0.173)S_hum.D_nneu}_{ijk} + \\
& \text{-0.230(0.141)S_sstd.D_nneu}_{ijk} + \text{-0.660(0.452)S_med.Smasters}_{ijk} + \\
& \text{0.761(0.398)S_busn.Dmasters}_{ijk} + \text{0.996(0.591)S_math.Dmasters}_{ijk} + \\
& \text{-0.042(0.016)S_amed.Age}_{ijk} + \text{-0.197(0.078)S_lang.Age}_{ijk} + \text{-0.031(0.011)S_Phys.Age}_{ijk} + \\
& \text{0.003(0.001)S_lang.Age.Age}_{ijk} + \text{0.156(0.095)D_nneu.Male}_{ijk} + \\
& \text{-0.709(0.205)R_ovsa.D_eu}_{ijk} + \text{0.511(0.218)R_inst.SMasters}_{ijk} + \\
& \text{0.784(0.475)R_char.DFirst}_{ijk} + \text{1.316(0.389)R_inst.DFirst}_{ijk} + \\
& \text{0.602(0.265)R_resc.DFirst}_{ijk} + \text{1.405(0.665)R_inds.DFirst}_{ijk} + \\
& \text{-1.051(0.534)R_ovsa.SUpperOther}_{ijk} + \text{-0.301(0.162)SMasters.D_nneu}_{ijk} + \\
& \text{-0.561(0.208)DMasters.D_nneu}_{ijk} + \text{-0.044(0.016)R_govn.Age}_{ijk} + \\
& \text{0.180(0.097)R_other.Age}_{ijk} + \text{-0.003(0.001)R_other.Age.Age}_{ijk} + \\
& \text{0.182(0.045)D_nneu.Age}_{ijk} + \text{-0.003(0.001)D_nneu.Age.Age}_{ijk} + \\
& \text{0.027(0.012)SMasters.Age}_{ijk} + \text{0.029(0.015)DMasters.Age}_{ijk}
\end{aligned}$$

$$\beta_{0jk} = 2.619(0.465) + v_{0k} + u_{0jk}$$

$$\begin{bmatrix} v_{0k} \end{bmatrix} \sim \text{N}(0, \Omega_v) \; : \; \Omega_v = \begin{bmatrix} 0.511(0.082) \end{bmatrix}$$

$$\begin{bmatrix} u_{0jk} \end{bmatrix} \sim \text{N}(0, \Omega_u) \; : \; \Omega_u = \begin{bmatrix} 0.072(0.021) \end{bmatrix}$$

$$\text{var}(\text{phdaward}_{ijk} | \pi_{ijk}) = \pi_{ijk}(1 - \pi_{ijk})/n_{ijk}$$

Model – Students who began on a part-time PhD course in 1996-97

$$\text{phdaward}_{ijk} \sim \text{Binomial}(n_{ijk}, \pi_{ijk})$$

$$\begin{aligned}\text{logit}(\pi_{ijk}) = {} & \beta_{0jk}\text{cons} + \text{-0.128(0.029)Age}_{ijk} + \text{0.001(0.000)Age.Age}_{ijk} + \\ & \text{0.436(0.262)Male}_{ijk} + \text{0.195(0.376)S\_agrc}_{jk} + \text{0.064(0.203)S\_amed}_{jk} + \\ & \text{-0.617(0.294)S\_arch}_{jk} + \text{1.030(0.505)S\_biol}_{jk} + \text{-0.227(0.195)S\_busn}_{jk} + \\ & \text{-6.300(2.442)S\_comb}_{jk} + \text{-0.660(0.282)S\_comp}_{jk} + \text{-1.830(0.798)S\_cart}_{jk} + \\ & \text{-0.345(0.190)S\_ed}_{jk} + \text{-0.452(0.207)S\_hum}_{jk} + \text{-5.143(1.750)S\_lang}_{jk} + \\ & \text{-0.432(0.391)S\_math}_{jk} + \text{0.674(0.190)S\_med}_{jk} + \text{-8.320(3.173)S\_ll}_{jk} + \\ & \text{-0.139(0.218)S\_phys}_{jk} + \text{-0.320(0.178)S\_sstd}_{jk} + \text{0.231(0.322)R\_char}_{ijk} + \\ & \text{0.217(0.156)R\_govn}_{ijk} + \text{2.575(1.455)R\_inst}_{ijk} + \text{-0.227(0.154)R\_other}_{ijk} + \\ & \text{0.254(0.440)R\_ovsa}_{ijk} + \text{0.075(0.417)R\_resc}_{ijk} + \text{-1.083(0.431)R\_inds}_{ijk} + \\ & \text{0.243(0.143)D\_eu}_{ijk} + \text{0.407(0.169)D\_nneu}_{ijk} + \text{0.182(0.139)SMasters}_{ijk} + \\ & \text{0.274(0.154)DMasters}_{ijk} + \text{0.463(0.310)SFirst}_{ijk} + \text{17.738(8.425)DFirst}_{ijk} + \\ & \text{-0.144(0.202)SUpperOther}_{ijk} + \text{0.033(0.220)DUpperOther}_{ijk} + \\ & \text{0.641(0.393)S\_cart.Male}_{ijk} + \text{1.673(0.762)S\_hum.D\_eu}_{ijk} + \\ & \text{1.348(0.520)S\_phys.D\_nneu}_{ijk} + \text{0.935(0.366)S\_ed.Smasters}_{ijk} + \\ & \text{2.157(1.216)S\_math.Dmasters}_{ijk} + \text{-0.026(0.015)S\_biol.Age}_{ijk} + \\ & \text{0.303(0.126)S\_comb.Age}_{ijk} + \text{0.036(0.020)S\_cart.Age}_{ijk} + \\ & \text{0.229(0.092)S\_lang.Age}_{ijk} + \text{0.408(0.169)S\_ll.Age}_{ijk} + \\ & \text{-0.004(0.002)S\_comb.Age.Age}_{ijk} + \text{-0.003(0.001)S\_lang.Age.Age}_{ijk} + \\ & \text{-0.005(0.002)S\_ll.Age.Age}_{ijk} + \text{-0.014(0.007)Male.Age}_{ijk} + \\ & \text{1.332(0.595)R\_ovsa.Male}_{ijk} + \text{-0.298(0.208)D\_nneu.Male}_{ijk} + \\ & \text{-1.146(0.552)R\_other.D\_eu}_{ijk} + \text{1.030(0.737)R\_inst.SFirst}_{ijk} + \\ & \text{1.263(0.885)R\_other.SUpperOther}_{ijk} + \text{-0.159(0.081)R\_inst.Age}_{ijk} + \\ & \text{0.002(0.001)R\_inst.Age.Age}_{ijk} + \text{0.024(0.012)R\_inds.Age}_{ijk} + \\ & \text{-1.123(0.547)DFirst.Age}_{ijk} + \text{0.017(0.008)DFirst.Age.Age}_{ijk}\end{aligned}$$

$$\beta_{0jk} = 1.985(0.595) + v_{0k} + u_{0jk}$$

$$\begin{bmatrix} v_{0k} \end{bmatrix} \sim \text{N}(0,\ \Omega_v)\ :\ \Omega_v = \begin{bmatrix} 0.214(0.055) \end{bmatrix}$$

$$\begin{bmatrix} u_{0jk} \end{bmatrix} \sim \text{N}(0,\ \Omega_u)\ :\ \Omega_u = \begin{bmatrix} 0.190(0.055) \end{bmatrix}$$

$$\text{var}(\text{phdaward}_{ijk} | \pi_{ijk}) = \pi_{ijk}(1 - \pi_{ijk})/n_{ijk}$$

Model – variables definitions

Type	Variable	Description
	Age	Student's age
	Male	Whether the student was male(1) or female(0)
Subject	S_agrc	Agriculture
	S_amed	Allied to medicine
	S_arch	Architecture
	S_biol	Biological sciences
	S_busn	Business
	S_comb	Combined subjects
	S_comp	Computing
	S_cart	Creative arts
	S_ed	Education
	BASELINE	Engineering
	S_lang	Languages
	S_ll	Law/librarianship
	S_math	Mathematics
	S_med	Medicine
	S_hum	Humanities
	S_phys	Physical sciences
	S_sstd	Social studies
Funding source	R_char	Charity / British Academy
	R_govn	Government
	R_inst	Institutional
	BASELINE	No financial backing
	R_other	Other
	R_ovsa	Overseas
	R_resc	Research Council
	R_inds	UK industry
Domicile	D_eu	EU
	BASELINE	UK
	D_nneu	Non-EU
Prior qualifications	Masters	Masters degree in 1995-96
	First	First class degree in 1995-96
	Upperother	Upper second class or other class of degree in 1995-96
	BASELINE	No masters or degree award in 1995-96
	Sxxx,Dxxx	S – attended same HEI, D – attended different HEI

List of abbreviations

EPSRC	Engineering & Physical Sciences Research Council
EU	European Union
FT	Full time
HEFCE	Higher Education Funding Council for England
HEFCW	Higher Education Funding Council for Wales
HEI	Higher education institution
HESA	Higher Education Statistics Agency
LEA	Local Education Authority
OECD	Organisation for Economic Co-operation and Development
OST	Office of Science and Technology
PT	Part time
QAA	Quality Assurance Agency for Higher Education
RAE	Research Assessment Exercise
ref.	Reference category used for each characteristic in the model specification
SHEFC	Scottish Higher Education Funding Council