

Who gets what? Understanding UK doctoral degree outcomes in terms of graduates' background characteristics and prior higher education experience

Executive Summary

- This study aimed to generate a better understanding of 'who gets what' from doctoral study through a quantitative analysis of doctoral graduates in the two most recent longitudinal Destinations of Leavers from Higher Education surveys.
- Doctoral graduates in the UK are a strikingly homogenous group, with distinct demographic clusterings along academic variables such as doctoral subject and institution.
- Ostensibly doctoral graduates secure better employment outcomes than those with a first degree only, enjoying a higher employment rate, more highly skilled work, increased earnings and reduced gender pay gap.
- Academic variables emerge as the strongest predictor of employment outcomes, although gender and age contribute to varying odds of entering academic employment or obtaining 'graduate level' work.
- For doctoral graduates leaving academia, there is strong evidence of a 'STEMM economy' but less so of a 'knowledge economy' where Social Science and Arts and Humanities doctoral graduates readily find research employment. Arts and Humanities doctoral outcomes warrant further exploration since these graduates are more likely to enter 'non-graduate' occupations, and report lower earnings and career satisfaction.
- The project has been presented across SRHE networks and three research outputs are in preparation.

1. Project Aims and Objectives

This study aimed to generate a better understanding of 'who gets what' from doctoral study, by analysing the employment outcomes of recent UK doctoral graduates. The research questions posed relate to a number of debates concerning the contemporary doctorate and higher education. First is the now longstanding articulation of the knowledge economy, and the expectation that higher education is a key driver of economic growth. Partially, this arises through the human capital higher education institutions 'produce', and doctoral graduates - expertly knowledgeable, highly skilled, innovative, and well-networked - are prized as particularly valuable (RCUK 2014; Cuthbert and Molla 2015; Department for Education 2017). Thus one aim of the study was to critically examine these policy claims with the most robust data on UK doctoral outcomes available.

A second, related, aim was to respond to the debate raised by learned societies and which plays out regularly in the pages of *Nature* and *Times Higher Education*, about whether doctoral graduates are professionally too fixed on academia and at risk of becoming 'disillusioned and directionless' (Nature 2014). This study extends understanding of the varied contributions doctoral graduates make, and challenges the notion that careers outside of the academy are in any sense 'alternative'. The final research aim was to understand not just how academic variables shape career pathways,

but to explore also the role of demographic characteristics. This is an especially novel aspect of the research, and relates to the persistence of socio-economic inequalities in the context of mass higher education, and the continued influence of socio-demographic characteristics on graduate employment outcomes (Britton et al. 2016; Laurison and Friedman 2017; Wakeling and Savage 2015).

2. Outline of methodology and project timetable

The following research questions were developed:

1. To what extent do doctoral outcomes differ by higher education institution and subject?
2. To what extent do doctoral outcomes differ by graduates' prior academic experience?
3. To what extent do doctoral outcomes differ by graduates' background characteristics?

These questions were answered using secondary data from the longitudinal Destinations of Leavers from Higher Education survey (LDLHE). The dataset was limited to UK domiciled doctoral graduates graduating in 2008/9 and 2010/11. The LDLHE collects employment data at 3.5 years after graduation (i.e 2012 and 2014). The unique aspect of this dataset was the linking of survey data to the Student Record. Academic and demographic characteristics were requested, including: subject area, institution, age, gender, ethnicity, parental education level, parental occupation, secondary school type and POLAR3 quintile (of home address when first entering higher education). The total dataset included 4731 cases (a 39.5% response rate). Data were weighted by HESA prior to analysis, meaning that the findings reported can be considered representative of UK domiciled doctoral graduates from these cohorts. The analysis undertaken consists of uni and bivariate descriptive statistics, followed by logistic and ordinal regression to ascertain which academic and demographic variables are associated with particular employment outcomes.

There are a number of noteworthy limitations with the dataset. RQ1 is limited by HESA's policy to release doctoral graduates' institution only in the form of university mission group, as opposed to individual institution. This reduces the analysis to 'Russell Group' and 'non-Russell Group', and prevents a detailed exploration of potentially significant employment variations within these categories. Pertinent to RQ2 is the absence of detailed information about graduates' first degree, including awarding institution or degree classification. Finally, RQ3 is somewhat hindered by the variable quality of data linkage. For example, graduates' school type and parental social class is only available for around ten percent of the sample. With a wholly quantitative study such as this, achieving sufficient numbers for analysis is critical to the robustness of the conclusions. Nevertheless the analysis achieved exceeds the level of detail of any prior research into UK doctoral outcomes.

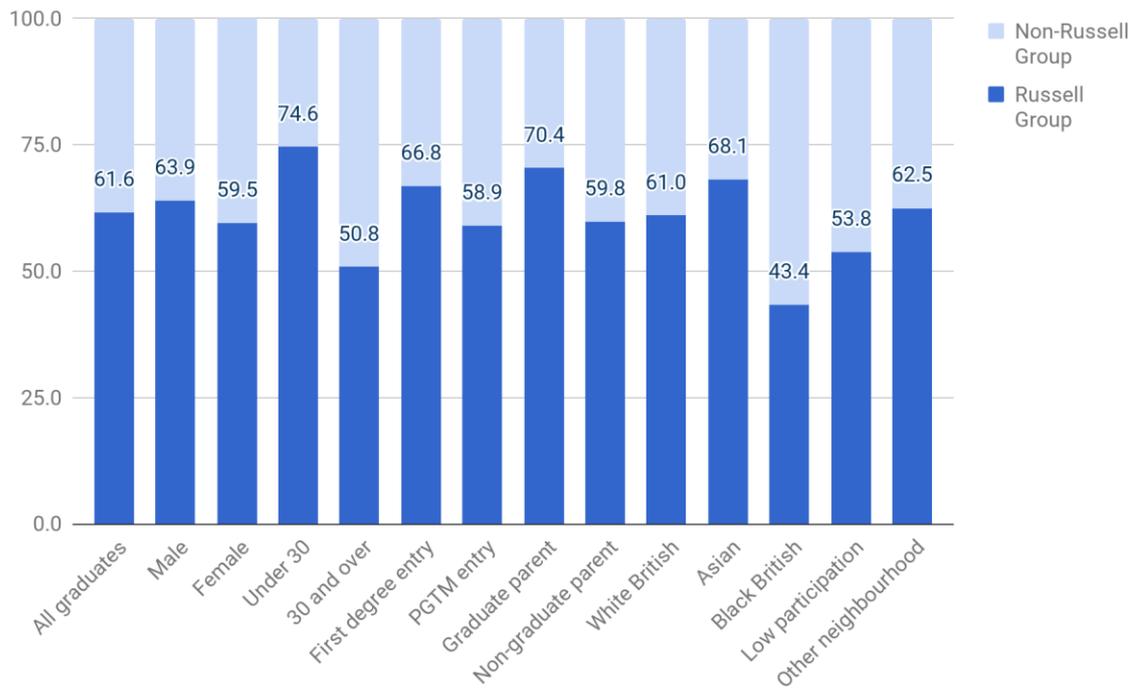
Timetable

2016	July	Specification of data submitted to HESA
	Sept - Dec	Literature review
2017	January	Final dataset received from HESA
	February	Cleaning and re-coding
	April - Sept	Substantive analysis
	Oct - Dec	Developing publication plan and commencement of writing

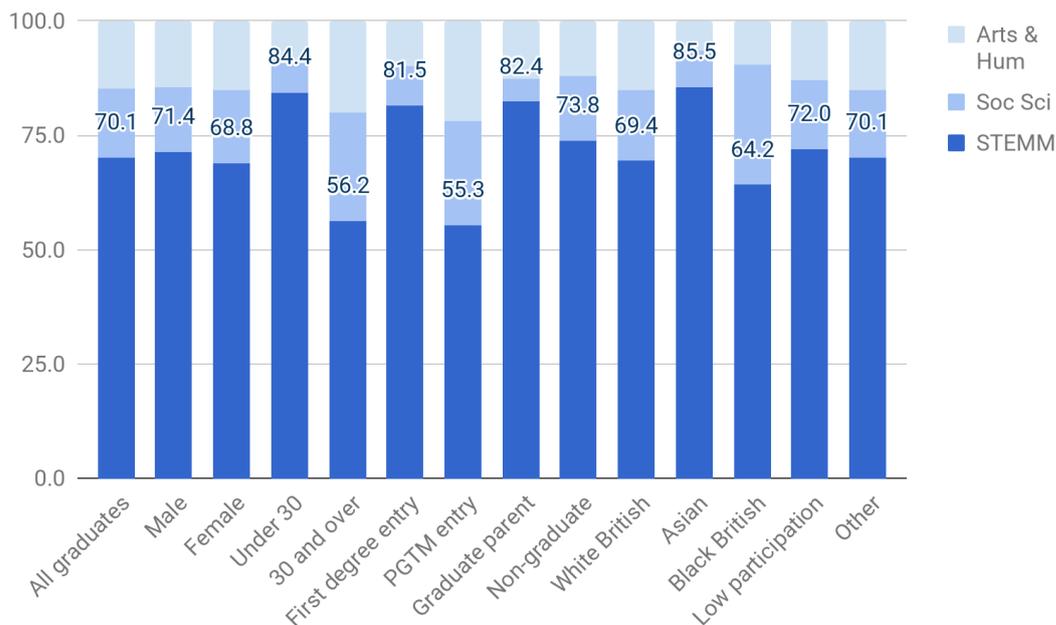
3. Analysis of results

Doctoral graduates - who are they?

The first observation to emphasise concerns the sample of doctoral graduates. This is a group with considerable homogeneity across academic and demographic variables, characterised by distinctive clusterings around doctoral subject and institution (3a and b).



3a. Doctoral institution by socio-demographic characteristics (n = 4,731)



3b.

Doctoral subject by socio-demographic characteristics (n = 4,731)

The patterns observed chime with earlier research on inequalities at the level of first and taught postgraduate degrees (Wakeling and Hampden-Thompson 2013). Noting these clusterings is significant to the present study, since doctoral subject and institution are hypothesised to bear considerable influence over employment outcomes.

Employment outcomes

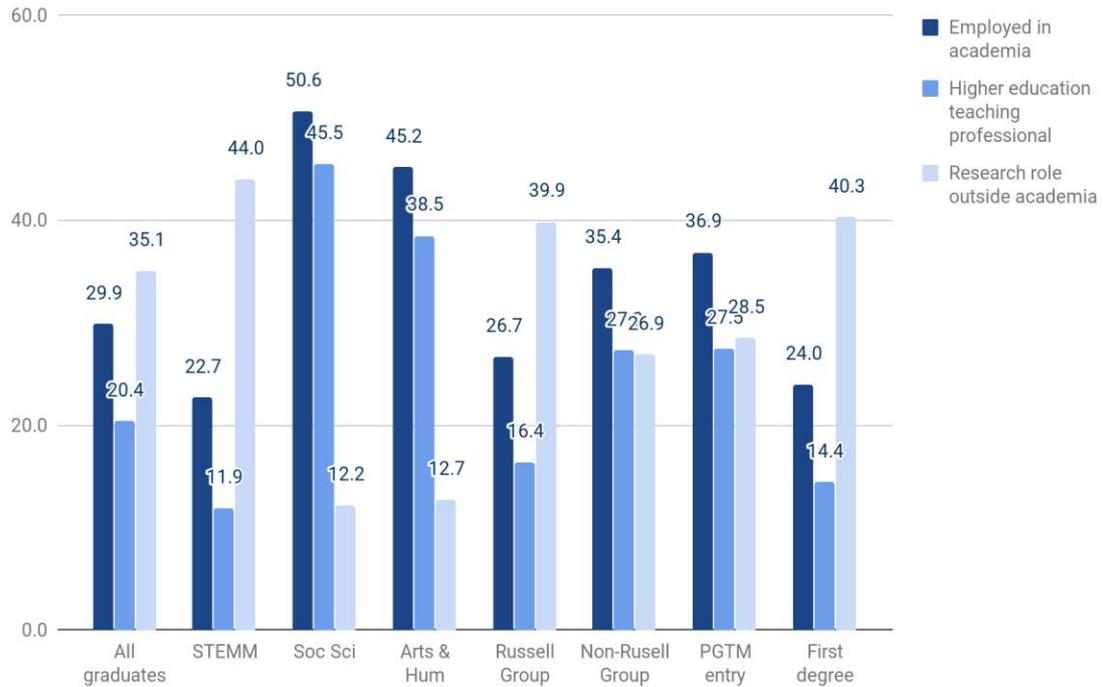
On a number of measures, doctoral graduates appear to secure better employment outcomes than those with a first degree only. Some 88% are employed, compared to 85% of first degree graduates after ten years in the labour market (Britton et al. 2016). Of those employed, over 80% are in 'expert' level work (c.f. Elias and Purcell 2013). The proportion employed in 'non-graduate' level roles is notably lower than that for first degree graduates (8.2%, compared to a range of 15-30% for first degree graduates [Behle 2016]). Median reported salaries are higher (£37,000) and there is a slightly reduced gender pay gap (median doctoral salaries are £36,000 female and £38,000 male, while median first degree salaries at ten years are £27,000 female and £30,000 male [Britton et al. 2016]).

Employment outcomes by academic and demographic characteristics

Doctoral graduates enter a diverse range of occupational sectors. Approximately one third enter academia and slightly more occupy a research role outside academia. Considerable differentiation is observed by doctoral institution and subject, and by certain demographic characteristics. The remainder of this section will highlight key findings regarding entry into academic and research employment, since it is not possible to examine the full set of results in the scope of this report.

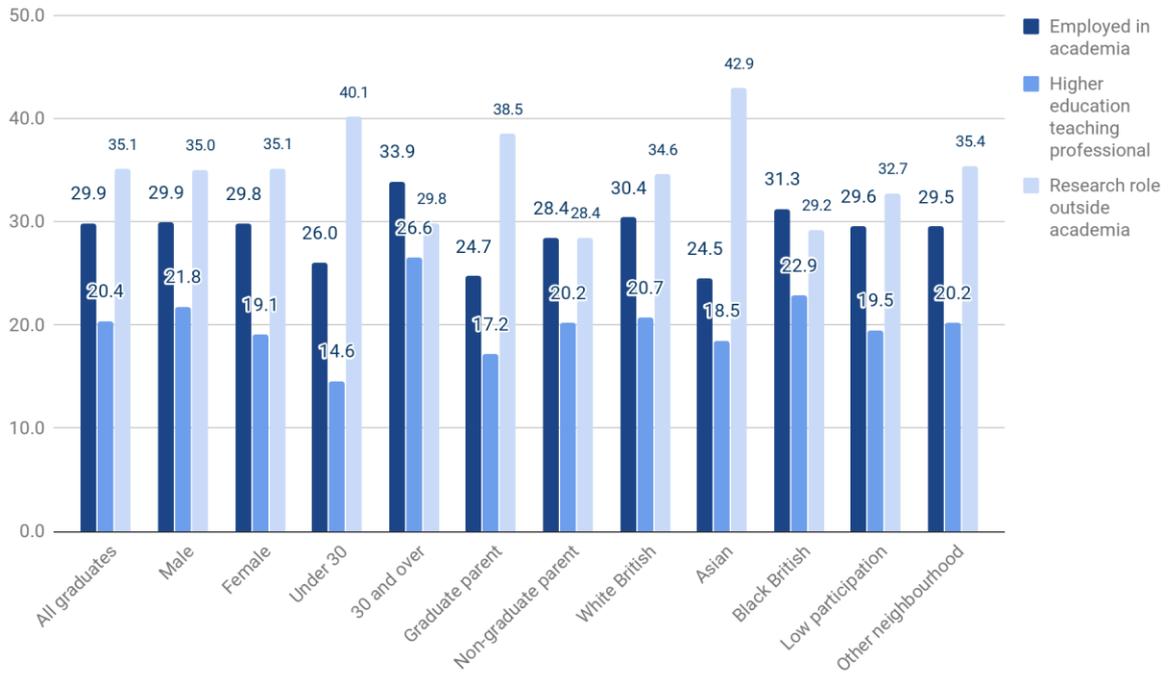
Charts 3c and d, below, set out academic and research employment by academic and socio-demographic characteristics. Considering RQ1, the highest rates of transition into academic careers are among Social Science and Arts and Humanities graduates. Compared to non-Russell Group, fewer Russell Group graduates enter academia, with considerably more securing a research role outside of academia. Related to RQ2, doctoral graduates with a taught postgraduate degree have a

higher rate of transition into academic careers than those with a first degree only, but fewer enter research roles outside of academia.



3c. Academic and research employment by academic characteristics (n = 4,731)

Chart 3d sets out academic and research employment by demographic variables, as explored by RQ3. Noteworthy here is that male graduates have a marginally higher rate of transition into academic careers than female graduates, and more so into the ‘higher education teaching professional’ occupation. White and Black British graduates have similar proportions entering academia. Fewer Asian graduates remain in academia, but this ethnic group have the highest proportion securing research work outside of academia.



3d. Academic and research employment by socio-demographic characteristics (n = 4,731)

Charts 3c and d demonstrate intriguing differences in academic and research employment by academic and demographic variables, but these patterns are complex, since doctoral graduates are not ‘randomly’ distributed by subject and institution in the first place (3a and b). A series of regressions were conducted to offer a better insight into how academic and demographic variables shape doctoral career pathways. One example model is reported below (3e). Several such analyses have been completed and will be reported in subsequent outputs from the study (see section 4).

	Model 1	Model 2	Model 3
	Odds Ratio	Odds Ratio	Odds Ratio
<i>Subject Area (ref: STEMM)</i>			
Social Sciences	0.19** ¹	0.19**	0.20**
Arts & Humanities	0.19**	0.19**	0.19**
<i>HEI (ref: Russell Group)</i>			
Non Russell Group	0.63**	0.65**	0.68**
<i>Entry qualification (ref: UG only)</i>			
PGTM qualification		0.85*	0.88
<i>Sex (ref: Female)</i>			
Male			0.9

¹ *p<.05, **p<.001

Survey Age (ref: <30)

30 and over	0.9
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Ethnicity (ref: White British)

Asian	1.09
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Black	0.85
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Other (including Mixed)	1.01
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Neighbourhood (ref: POLAR >2)

Low participation neighbourhood	0.89
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Log likelihood	-2544.3319	-2431.602	-2221.7178
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Pseudo r2	0.0842	0.0860	0.0834
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<i>Number</i>	4,288	4,103	3,737
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3e. Binary logistic regression: entering a research role outside of academia

This model estimates relative odds of entering a research role outside of academia. The odds of each reference group are held constant at 1 - so to say, approximately 5 STEMM graduates are employed in a research role outside of the university for every 1 Social Science graduate. Models 1 and 2 show the effect of academic characteristics, while model 3 introduces socio-demographic variables. Academic variables retain significance, but in this model demographic characteristics do not have a significant impact.

4. Project conclusions and outcomes

The first finding to emphasise is the striking homogeneity of doctoral graduates. A sample of limited diversity generates challenges for researchers hoping to explore differentiation across a set of independent variables. The clustering observed (3a, b) points to earlier inequalities ‘passing-up’ through the higher education system, and suggests that the recent ‘Inclusion Matters’ call from RCUK is well founded².

Academic variables emerged as the strongest predictor of employment outcomes, although gender and age contributed to varying odds of entering academic employment or obtaining ‘graduate level’ work. For doctoral graduates leaving academia, there is strong evidence of a ‘STEMM economy’ but less so of a ‘knowledge economy’ in which Social Science and Arts and Humanities doctoral graduates find research employment.

Though not discussed in the results presented here, further analyses suggest that the career outcomes of Arts and Humanities doctoral graduates warrant further exploration, for those who do not enter academic or research employment are more likely to enter ‘non-graduate’ employment, and on the whole these graduates report lower earnings and career satisfaction.

The following presentations have been given to date:

² <https://www.epsrc.ac.uk/funding/calls/inclusionmatters/>

- 'Inequalities in the take-up of postgraduate studies after graduation', SRHE Access and Widening Participation event, London, March 2017
- 'Broken promises? The outcomes of doctoral graduates in the UK', the Centre for Education and Policy Analysis, Liverpool Hope University, March 2017
- 'Postgraduate destinations - social science doctoral graduates in the UK', SRHE Employability, Enterprise and Work-based learning, University of Edinburgh, May 2017
- 'Social Mobility beyond higher education? Routes to progression', University of Cardiff, June 2017
- 'Success in a knowledge economy? Understanding the early labour market experiences of doctoral graduates in the UK', Centre for Higher Education Studies, UCL Institute of Education, November 2017
- 'Success in a knowledge economy? Understanding the early labour market experiences of doctoral graduates in the UK', SRHE Annual Research conference, December 2017

Three research outputs are currently being prepared:

Provisional title	Scope and target journal	Submission date
Success in a knowledge economy? Exploring the early labour market experiences of UK PhD graduates	8,000 words on employment outcomes, focusing on occupational sector, skill level, and role, and variations <i>Higher Education</i>	March 2018
'Someone needs to tell the rest what happens next...' Entry into academic careers in the UK	7000 words on entry into academic careers, and variations <i>Studies in Higher Education</i>	July 2018
Mixed fortunes: examining employment and earnings for UK PhD graduates	Shorter piece of 3,000-4,000 on earnings data (and data quality) <i>Science, Nature or Work, Employment and Society</i>	May 2018

The NR award provided essential financial support to acquire the data and support dissemination of the research. In terms of research and methodological expertise, I could not have hoped for a more well matched mentor, Dr. Heike Behle. Through joining the R&D committee and invitations to present at SRHE network events, I met many other researchers working in the field of graduate outcomes in the UK. Intellectually this award opened up the space to work independently on a new piece of research that I hope will form the basis of a larger grant application to study the early careers of doctoral graduates with a qualitative and longitudinal element, to be submitted by early 2019.

Acknowledgements

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preparation of the dataset. Finally I wish to thank colleagues across SRHE networks (Access and Widening Participation; Employability, Enterprise and Work-based Learning) and at the Centre for Higher Education Studies, UCL Institute of Education, for opportunities to present preliminary findings and receive invaluable feedback on these.

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