

# WIDENING PARTICIPATION FROM UNDERGRADUATE TO POSTGRADUATE RESEARCH DEGREES

## A Research Synthesis

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## 1 EXECUTIVE SUMMARY

This research synthesis was commissioned by the National Co-ordinating Centre for Public Engagement (NCCPE) and the Economic and Social Research Council (ESRC) to investigate research and summarise findings about widening participation from undergraduate to postgraduate research degrees. It discusses the evidence in this area about UK-domiciled students, but with some reference to international evidence where appropriate. It is clear that this is a complex and somewhat under-researched area, but one which is growing in importance. Undergraduate and postgraduate student numbers have risen rapidly in recent years and although there has been stability at postgraduate research level, there is increasing recognition both of the need to ensure equality of access to research degrees to secure the diversity and vitality of the research workforce and of general 'inflationary' pressures on qualifications, pushing people towards gaining higher qualifications still.

The synthesis shows that, in contrast to initial access to higher education, there is little research on entry to postgraduate study, including postgraduate research degrees. There is some research on the effect of academic and financial factors on research degree entry and a reasonably well-developed body of work focusing on women's underrepresentation at doctoral level, especially in the sciences. The evidence base relating to potential inequalities on the basis of ethnicity and social class is more limited, with some obvious gaps. Beyond that, there are a range of areas where there is very little or no previous research, including non-doctoral research degrees, the application process for research degree study, sources of advice, graduate aspirations, transfer of subject and institution between undergraduate and postgraduate research levels, sources of maintenance support and the influence of family commitments, student debt, disability and sexuality.

### 1.1 Are postgraduate research students drawn disproportionately from certain backgrounds or groups?

- The clearest evidence of underrepresentation is of the group about whom there is the most readily-available data and the highest volume of existing research: women (section 9).
- It is reasonably well-established that socio-economic class has no direct effect on *immediate* progression to postgraduate research study once academic factors are taken into account. However there is some suggestion that class inequalities re-appear in *later* entry to postgraduate research study, with those from lower socio-economic

classes being disadvantaged. This is supported by international evidence (section 7).

- Although it has received comparatively little attention in recent debates, ethnicity has a bearing on access to postgraduate research degrees, both in immediate progression after a first degree and in later transitions. Many, but not all ethnic groups are underrepresented at postgraduate research level compared to the white group (section 8)
- Access to financial resources (as distinct from socio-economic class) emerged as another factor affecting access to postgraduate research degrees. However the available evidence does not suggest a clear link between lack of student debt and research degree participation. There is some evidence that women and students from lower socio-economic classes are less likely to receive research council studentships, but more evidence is required in this area (section 6).
- Progression to postgraduate study varies according to 'academic' structural factors such as attainment, subject of study and institution attended at first degree level. Attaining first-class honours, graduating in physical science subjects and attending a pre-1992 university are all closely associated with progression to a research degree. These characteristics are not evenly distributed across gender, ethnicity and socio-economic class which may partly account for apparent inequalities in access to research degrees along these lines (sections 3.2, 3.3 and 5).

## **1.2 Are there potential differences in recruitment between types of university or subject area?**

- There are clear and substantial differences between subject areas which structure the nature and volume of postgraduate research study (sections 3.2 and 5.2).
- Postgraduate research students are very differently distributed across both subject areas and institutions to undergraduate patterns. Research students are overwhelmingly concentrated in pre-1992 universities, especially those which belong to the Russell Group (sections 3.3 and 5.3).
- Little is known about the flow of students between and within subject areas and institutions between undergraduate and postgraduate research levels (sections 2.4, 3.4, 5.2 and 5.3.3): that is, do students

move from one sector or subject to another, or do subjects and institutions largely recruit from their own graduates?

- We can be reasonably certain that attending a selective university as an undergraduate, regardless of other background characteristics, has a strong positive influence on progression to postgraduate research study. Whether or not this is considered fair and meritocratic, there are certainly implications for the diversity of the postgraduate research student body (sections 5.3 and 6.2.2).

### **1.3 Does evidence demonstrate an impact or implication of such differences on the diversity of the research workforce?**

- There is a high likelihood that the patterns of entry to postgraduate research study by gender and ethnicity will affect the diversity of the research workforce (sections 8.6 and 9.1).
- It is difficult to determine with certainty whether there are implications for the diversity of the workforce arising from patterns of entry by socio-economic class, although we suspect this to be the case (section 7.5).

### **1.4 Are there gaps in the information available?**

- Much research does not separate postgraduate research students from postgraduates more generally, making drawing specific conclusions about research students more tricky (section 2.2.1).
- There is no initial participation rate statistic produced for postgraduate research study. Such a statistic could be analysed according to the widening participation indicators discussed in this review (section 3.1).
- There are significant gaps in the data available about postgraduate research students' backgrounds. Socio-economic class data is largely missing and that which is collected at present is not thought to be valid. This might be better captured by record linking in the Higher Education Statistics Agency (HESA) Student Record between undergraduate and postgraduate levels. Information on research students' parents' education is not (yet) collected. Little is known about postgraduate research students' dependants (sections 7.1, 7.3 and 10.1).
- Understanding of perceptions of, aspirations towards and motivations for postgraduate research study among potential students is largely

absent and could be vastly improved. Little is known about the image of research degrees among potential students' or their understanding of any likely benefits of research degree study. This ought to be analysed in terms of the widening participation indicators discussed. Current research suffers from being attitudinal only or cross-sectional, so that intentions are not compared to outcomes. Later entrants to research degrees also need to be better researched (section 4).

- The process of finding out about, applying for and gaining admission to postgraduate research study is barely understood. There is no national application data and this hampers any attempt to carry out investigations into widening participation such as those done at undergraduate level with Universities and Colleges Admissions Service (UCAS) data (section 3.4).
- Better data is required on the sources of tuition and maintenance funding for postgraduate research students according to their background characteristics. Research is also needed on the impact of finance on decision-making at this level (section 6).
- Finally, for the three major widening participation indicators (ethnicity, gender, socio-economic class), better explanations of the causes of any inequalities in access to postgraduate research are required. Much existing research is descriptive or based on testimonies which hint at explanations, but are too small in scale to establish broad applicability (sections 7, 8 and 9).

### **1.5 Recommendations for further research**

**R1** A better understanding of the extent and nature of sub-doctoral research degrees is required, including the characteristics and motivations of students taking such degrees.

**R2** There is a clear need for research into the process of applying for research degree study. This should cover how potential research students find out about research degrees and how they decide whether and where to apply (including their aspirations and perceptions of the benefits or drawbacks of a research degree). It should cover factors affecting their decision to apply and the decision-making process. It

## **1.5 Recommendations for further research (continued)**

should also investigate whether there are inequalities in the offer of a place and/or funding on the basis of social class background, ethnicity, gender and so on. The *Futuretrack* project offers a potential model for such a study.

**R3** Research is needed on the mobility of students across subject disciplines and institutions between undergraduate and postgraduate research levels. There are clear indications that students with a first degree in certain subjects and from certain institutions are more likely to progress immediately to postgraduate research. However other patterns of 'import' and 'export' are unknown.

**R4** Very little is currently known about postgraduate research students' financial circumstances. Further research is needed to establish the effect of financial factors on access and to understand sources of maintenance funding, the potential impact of student debt and supplementary income and employment.

**R5** There should be further investigation of the influence on social class background on access to postgraduate research degrees, particularly in trying to understand patterns of non-contiguous entry and on the implications of any inequalities observed for the diversity of the research workforce.

**R6** Further research is required into ethnic inequalities in access to postgraduate research degrees, especially that which moves beyond description to consider why any differences arise.

**R7** Similarly, there is scope for a better understanding of the reasons why women are less likely to enter a research degree than men (across all subjects). An appropriate starting point would be large-scale quantitative research which compares participant and non-participant women.

**R8** There is a paucity of research on the impact of other factors on take-up of postgraduate research, including family commitments (children, intimate partnerships), disability and sexuality. These areas should be investigated further.

## 2 INTRODUCTION

### Summary

- Unlike at undergraduate level, there is an acknowledged shortage of research on access to postgraduate research degrees.
- Attention has been drawn to the issue recently by a range of commentators. This has included researchers, stakeholder groups and government bodies.
- Concern about widening participation in postgraduate research can be thought of in three ways: as about social justice; accessing the widest possible talent pool to supply future researchers; and about the effect of concentrating funding for research and doctoral training.
- The review covers evidence about the entry of UK-domiciled students to research degrees at masters and doctoral level, mainly from the last decade. Little is known about the purpose of non-doctoral research degrees, the students who take them and their motivations.
- There is an element of complexity in postgraduate research, especially disciplinary differences in its purpose and format and the kind of students enrolled.

### 2.1 The brief

This report is a synthesis of research into widening participation from undergraduate to postgraduate research degrees. It represents the outcome of a review of research in this area which was commissioned by the National Coordinating Centre for Public Engagement (NCCPE) and the Economic and Social Research Council (ESRC). The brief for the research synthesis was to

uncover and synthesise current academic literature and report on this topic. It is intended that the synthesis will outline the existing data and highlight any trends and/or gaps in existing knowledge.

The following areas for synthesis of research were indicated, namely whether:

- Postgraduate research students are disproportionately drawn from certain backgrounds or groups;

- There are potential differences in recruitment between types of university or subject area;
- Evidence demonstrates the impact and/or implications on the diversity of the research workforce;
- There are gaps in the information available (eg regarding gender, ethnicity, socio-economic factors).

## 2.2 Context for the review

### 2.2.1 Availability of prior research

There is a substantial body of research about widening participation in and access to initial higher education, both in the UK and internationally. This research has been comprehensively reviewed elsewhere (see Gorard *et al*, 2006, 2007). We now know a considerable amount about what factors affect entry to undergraduate education and the difficulties experienced by students and potential students of various hitherto underrepresented backgrounds in comparison with students from groups which are traditionally well-represented in higher education. There is also a growing understanding of practices and policies at institutional, regional and national levels which are intended to encourage and support initial entry to higher education for potential students from a variety of backgrounds. Government interest in this issue has been sustained and supported by significant additional funding across the UK both inside and outside of higher education. Schools, colleges and universities have also committed to the widening participation agenda. Whilst there has been doubt expressed about the impact of this emphasis on access (eg Gorard, 2005; National Audit Office, 2008), there is also some suggestion of positive change on one of the most stubborn indicators, the representation of students from lower socio-economic groups (Higher Education Funding Council for England, 2010). There is certainly evidence that women and ethnic minorities are 'overrepresented' among initial undergraduate entrants (Connor *et al*, 2004; Higher Education Policy Institute, 2009; Equality Challenge Unit, 2009a), although there are also suggestions that these overall rates hide real inequalities in the location and type of higher education accessed by different groups and in the experience of being a student (Curtis, 2006; Leathwood, 2004; Leathwood and Read, 2009). It is beyond doubt however that there is party-political consensus on support for widening participation to undergraduate study.

Far less has been written about the transition from undergraduate to postgraduate study. This is surprising, given the huge growth in postgraduate student numbers both in the UK and internationally in the last 20 – 30 years. Indeed this growth has been something of a 'quiet revolution',

with postgraduate activity *quintupling* in the UK in the 15 years from 1990, accompanied by substantial growth in most of the developed world (Wakeling, 2009a and forthcoming). It should be noted however that much of this growth has been in taught postgraduate programmes. Although there has been expansion of research degrees too, the scale has been smaller and much of it can be assigned to non-UK nationals who come to the UK to study and leave at the conclusion of their postgraduate research. In an analysis of HESA data, House (2010) reports a nine per cent increase in research degree entrants between 2002/03 and 2007/08, most of which is attributable to students from outside the EU. Similarly, Artess *et al* (2008), in reviewing the period 2000/01 to 2005/06 report an increase in UK-based doctoral research numbers of less than one per cent and a decline of about 19 per cent in UK-based masters by research students. Given that the number of first-degree graduates has risen across this period, the figures indicate a relative decline in the popularity of research degree study for home students.

A number of recent reports issued by government and associated bodies have begun to draw attention to the issue of access to postgraduate education in general. In their review of widening participation research, Gorard *et al* (2006, p. 113) concluded “there appears to be a significant lack of awareness about widening participation in postgraduate study”. The National Postgraduate Committee (NPC), a body which represents the interests of postgraduate students has argued for the extension of the widening participation agenda to postgraduates (Hoad, 2001). The National Union of Students (NUS) echoes this sentiment:

as the widening participation agenda takes hold at undergraduate level, postgraduate study is increasingly becoming a means of differentiating oneself in a crowded job market. As such, we should be concerned about the demographic makeup of the postgraduate population and whether there are barriers to postgraduate study that affect some groups disproportionately.

(NUS, 2009, p. 28)

Alan Milburn’s panel which investigated access to professional employment also concerned itself with this issue.

[P]ostgraduate degrees...have increasingly become an important route into many professional careers – in the law, creative industries, the Civil Service, management professions and others. But these courses are substantially more expensive than undergraduate degrees...and there is no student support framework equivalent to the framework for

undergraduates. If fair access is to be possible, this issue will need to be addressed.

(Panel on Fair Access to the Professions, 2009, p. 95)

Many have also drawn attention to a distinct lack of prior research and even available data in this area. The NUS again highlights this:

Data that would aid a better understanding of factors that influence participation in postgraduate study is in most cases not available. [...] At the very least we need to know how factors such as social class and institution of first degree interplay with participation in postgraduate study, as well as factors like gender, ethnicity and disability for which there is more information.

(NUS, 2009, pp. 28 – 29)

This point is echoed by Wakeling's (2009a, p. 85) research on the topic:

there is very little evidence on factors affecting access to postgraduate study, either in the UK or abroad. Previous investigations of postgraduate study in the UK have either ignored access or could not consider it due to lack of suitable data.

Successive reviews of postgraduate education in the UK by the Higher Education Policy Institute (House, 2010; Sastry 2004a, b) have highlighted a lack of data in certain areas about postgraduate students' backgrounds. It tends mainly to be data about socio-economic background that is missing though, as there is better provision of information about gender and ethnic group.

The question of socio-economic participation in postgraduate education is important, but difficult to address given the current data.[...] Without clear data on the socio-economic history of postgraduate students, it will be difficult to implement and assess the success of measures to increase postgraduate participation and thus widen access to the top professional jobs.

(House, 2010, pp. 21 – 22)

In short, there are clearly growing concerns about access to postgraduate education as study at this level and at undergraduate level expands. As a result of this growing concern, the Postgraduate Review, recently undertaken for the Department of Business, Innovation and Skills (BIS), considered access to postgraduate study as one of its six themes. It noted clear gaps in our understanding of the background characteristics of postgraduate students

which mean it is difficult to determine whether there are in fact problems to be addressed. This is partly as a result of an absence of appropriate data about postgraduates: the Postgraduate Review recommends that a joint working group of funding bodies, HESA and other stakeholders be established to advise on potential improvements to data collection (BIS, 2010).

Most of the public debate in this area does not distinguish between different kinds of postgraduate study, or, if it does, relates principally to access to *taught* postgraduate qualifications, such as masters degrees. Consideration of widening participation to *postgraduate research degrees* is arguably overlooked to a greater extent than, as even within the limited discussion of access to postgraduate study, these programmes tend not to be mentioned.

The Thrift review of research careers, which in part prompted both this research synthesis and the Postgraduate Review summarises the situation:

During the course of this review it has become clear that very little is known about the socioeconomic and demographic makeup of those UK students who go into postgraduate study. When compared with the now extensive knowledge of undergraduates with regard to factors such as gender, ethnicity, social class and disability, many questions concerning what, when and why students enter postgraduate study, and particularly postgraduate research, remain unanswered. There is still little in the way of appropriate data to allow an analysis of postgraduate participation at national level either by the funding councils or research councils.

(Thrift, 2008, p. 20)

### 2.2.2 *Broad concerns in widening participation to research degrees*

There are three interweaving strands to the emerging policy debate as they relate to widening participation to postgraduate research degrees.

Firstly, there is a concern with ensuring *social justice*. That is to say, observers are keen to ensure that entry to postgraduate research is open to all regardless of gender, ethnicity, social class background or any other such characteristic and that none are unfairly disadvantaged in this pursuit. From a position in the 1980s where holding a PhD had only negligible effects on lifetime earnings (or even a negative impact) (Rudd 1986, 1990), it would now appear that those qualified to doctoral level can command an earnings premium over those with first degrees or other postgraduate qualifications (O'Leary and Sloane, 2005; Machin and Murphy, 2010). Doctoral graduates are less likely to be unemployed than other graduates (Haynes *et al*, 2009) and typically enjoy

good working conditions. There is concern therefore that those from certain backgrounds are better able to secure these advantages. Changes to the financial support package for full-time undergraduate students has prompted several bodies to suggest that student debt may deter those from less affluent families from undertaking postgraduate study (NPC, 2006; NUS, 2009; The Royal Society, 2008).

Secondly there is concern about accessing the *widest possible talent pool* for research careers. The intention here is to ensure that the UK remains competitive in economic and scientific terms by recruiting the most able people into research, whatever their background. If there are real or perceived barriers to entry to a research degree for those from particular groups, this could reduce the available talent pool. Concerns of this nature lay behind the Roberts Review (2002) which made recommendations aimed at encouraging entry to a research career, including a substantial increase in the financial support available to research students funded by the UK Research Councils.

Finally, and most recently, there has been intense debate about *concentration of research funding*. So called 'quality related' (QR) funding for academic research which is distributed by the UK's higher education funding councils using the results of the Research Assessment Exercise has been increasingly targeted at the very highest performing departments in higher education institutions. After the most recent such exercise, in 2008, much attention was given to the discovery of 'islands of excellence', meaning research of international standing taking place in institutions which are not typically considered to be 'research intensive'. Proposals to concentrate funding for research degree study have developed in parallel to this debate. Individual research councils have shifted to a 'Doctoral Training Centre' model which effectively concentrates studentship funding in a limited number of institutions. HEFCE, the English funding council, is considering restricting funds for the support of research students to institutions meeting a particular threshold in the periodic Research Assessment Exercise (RAE). Representative bodies for institutions with different missions have argued against (Million+, 2010; University Alliance, 2009) or in favour (Norton, 2010; The Russell Group of Universities, 2010) of this policy. The Postgraduate Review commissioned by BIS also recommends concentration of funding for research training in England, although it partially qualifies this recommendation by suggesting that this approach is most appropriate for "high cost science and technology disciplines" (BIS, 2010, p. 75). The implications of these policies for the diversity of research degree students are alluded to by Nigel Thrift (2008, pp. 21 and 23) in his review of research careers for BIS:

it remains the case that around 50 per cent of postgraduate research students are found in Russell Group institutions (with around a third concentrated in just eight institutions). [...] It is possible that [an] 'escalator' effect – caused by the greater proportion of students from more affluent socio-economic groups found in the undergraduate intake to many Russell Group institutions, a population which then dominates the recruitment pool for doctoral students - could continue to reduce the socio-economic diversity of postgraduate researchers and, ultimately, the UK's research community. But, it must be emphasised that this issue requires further exploration to identify whether there is genuine cause for concern.

The Postgraduate Review however highlights collaborative provision, rather than simply selection of the best-performing departments and centres, as a means of concentrating funding. Examples of this approach in the devolved administrations are cited approvingly, including the Wales Institute for Cognitive Neuroscience, which involves Bangor, Cardiff and Swansea universities. The Scottish Universities Physics Alliance, which includes eight partner institutions, is another example.

The research synthesis will draw on research which covers all three of these different strands. However it should be noted that they may at times be contradictory: it is possible to increase access to research degrees (and thus draw on a larger 'pool of talent') but without addressing issues of equity and social justice.

## **2.3 The scope of this review**

### *2.3.1 Types of qualification*

The review is concerned with widening participation from undergraduate to postgraduate research degrees. It therefore only covers entry to taught postgraduate education insofar as this affects onward progress to a research degree.<sup>1</sup> Many postgraduate research students have previously completed a taught postgraduate qualification *en route*, sometimes as a necessary 'stepping stone' to their current course. HEFCE (2005a) show that of those entering a PhD programme in 1996/97, around 16 per cent had completed a masters degree in 1995/96. This had risen to 17 per cent for 1999/2000 entrants

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<sup>1</sup> A submission was made to the BIS Postgraduate Review by Paul Wakeling which covered access and entry to taught postgraduate study. This submission was independent of the NCCPE-ESRC research synthesis. An interim report on the synthesis was also made available to the Review.

(HEFCE, 2007). Looking at UK students starting a PhD full time in 2004/05, ten per cent had completed a masters degree in the previous year, with a further 32 per cent having completed a masters degree at an earlier point. The trend was a substantial increase in the proportion of those holding a masters degree among successive PhD cohorts, but with the majority of new PhD students *not* holding a masters degree (HEFCE, 2009). No data is presented by HEFCE, but it is possible that previous disciplinary differences in entry qualifications are being replaced by convergence on the bachelors-masters-doctorate model.<sup>2</sup> Increasingly entrants to PhD programmes in the arts, humanities and social sciences are expected to hold a masters degree, particularly if they seek funding from a research council. It would appear to be emerging as the norm in natural science subjects too, where there has been an increase in 'MRes' style research training courses. In Physics or Chemistry, entry is frequently from an 'enhanced' undergraduate masters degree, such as MChem, MPhys, etc.

There are now a range of doctorates offered, typically in professional subjects, which are not assessed wholly or mainly on the basis of a research-based thesis. So-called taught or professional doctorates are common in education (EdD), engineering (EngD), business and management studies (DBA), law (LLD), medical subjects (MD, DClinPsych) and so on. These are often taught part-time to practising professionals and incorporate advanced-level taught courses and an extended study of some description, but the thesis element is usually much shorter. House (2010) reports 820 new starters on such programmes in 2007/08, up from just over 600 five years previously.

Whilst taught qualifications, including taught doctorates, are out of scope, masters degrees are not, since it is possible to obtain a masters degree by research via either one or two years of full-time study or equivalent. For example in the authors' department students can register for a MA in Education (by research); a MPhil in Education; or a PhD in Education. These courses are of one, two and three years' full-time duration respectively. Currently, the MPhil degree is rarely opted for by students, but it remains on the books of many institutions, with its popularity probably varying by discipline.<sup>3</sup> Student numbers on masters by research have been declining in

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<sup>2</sup> This reflects international convergence on the so-called LMD model which is at the heart of the Bologna Process to standardise higher education qualifications in Europe and beyond.

<sup>3</sup> Matters are not helped by confusing nomenclature. At some institutions 'MPhil' is a taught higher degree, of one or two years' duration. It is also possible at a few universities to take a 'BPhil' degree, which is equivalent to a MA/MSc by research. A further complication is the practice of registering new research students for the MPhil qualification, with a later 'upgrade' process being required to change them to PhD. Other institutions use the concept of 'probationary' or 'provisional' PhD registration instead.

recent years – House (2010) reports a 24 per cent reduction in new starters between 2002/03 and 2007/08 - but it is not clear whether this decline relates to registrations on one- or two-year masters by research.

Often the term ‘research degree’ is used as a synonym for ‘PhD’. Apart from the length of the different qualifications, there are other important differences. The PhD is almost always examined by thesis and an oral examination (the ‘viva voce’) whereas masters by research may dispense with this requirement and usually do not require an ‘original contribution to knowledge’ as a criterion of award. Perhaps more importantly for the purposes of this synthesis, there is funding available for PhD study on a much larger scale than that available for research degrees at masters level, the latter not attracting significant funding from research councils and other major postgraduate funding bodies.

The large majority of research students are intending to obtain a PhD. New entrants to PhDs outnumber new entrants to other research degrees by about 3 to 1. For that reason, most of the attention in this review is paid to PhDs. However it is worth noting that little is currently known about the purpose of non-doctoral research degrees, the students who take them and their motivations in doing so. Such qualifications might be an innovative means of increasing those qualified to enter the research workforce as an alternative to a PhD. The relationship of the masters by research to the PhD would perhaps be like that of the foundation degree to the bachelors degree. These qualifications would benefit from research into their nature and take-up.

### 2.3.2 *Coverage*

This synthesis focuses primarily on entry to research degrees in the UK. Partly because of the lack of research in this area in the UK and partly because of clear similarities across countries there will also be reference to international evidence. Many, if not all of the issues related to participation in research degree study are common to other national systems, even if there are differences in the precise progression routes out of undergraduate study and different funding regimes in place.

As is conventionally the case when investigating widening participation matters in the UK, non-UK-domiciled (‘international’) students are, where possible, excluded from the synthesis. This is because international students arrive here from very different circumstances across the world. In assessing the openness of research degree study to students from minority ethnic backgrounds for instance, including international students confounds the analysis since they will almost certainly not identify with the various ‘British’ ethnic groups measured in official categories.

A previous research synthesis conducted for ESRC and Research Councils UK (RCUK) covered the outcome of PhD programmes (Raddon and Sung, 2009) and so we do not address outcomes in detail here. Nor is there comprehensive coverage of students' experiences during research degree study. There is a greater range of research on this subject, but this also has been reviewed in a publication for the Higher Education Academy, which does however note an absence of consideration of the gender, ethnicity, age, social class and so on of doctoral students in terms of how this might impact on their experience (Leonard *et al*, 2006). Universities UK's recent publication on the UK doctorate provides background information on doctoral-level research degrees and examines some of the issues facing the qualification in this country (Emery and Metcalfe, 2009).

The synthesis focuses on research published in the last decade or so. Occasionally it is necessary to refer to older research. The focus of attention is on the UK, although where relevant, international research and examples are considered. It is worth noting that many of the general patterns which apply to research degrees in the UK also apply elsewhere.

### 2.3.3 *Approach adopted*

The synthesis includes literature of different types. Where possible we have sourced peer-reviewed academic literature. However given the known lack of academic research in the area as a whole, we have also referred to unpublished academic work and theses; and the 'grey' literature, which here includes government reports, research conducted by or on behalf of representative bodies of various types or which is statistical and descriptive in nature.

We have tried to give some indication of the strengths and weaknesses of the research covered in the review. As can be the case in educational research, we had expected to find a number of small-scale studies, based on a single department or institution, which we would have treated differently to larger-scale and comparative studies. In the event, there were few studies of any kind which bore directly on the topic in hand. We have thus tried to give the results of studies and to provide some comment and judgement on shortcomings, rather than adopting a 'systematic review' approach.

## 2.4 Complexity

In comparison to undergraduate study, postgraduate study is markedly more complex (Artess *et al*, 2008; Rudd, 1975; Sastry, 2004a; Wakeling, 2009a). There are a range of qualifications, funding arrangements, intended destinations, expected entry points and target 'markets'. Moreover the student body itself is heterogeneous (O'Donnell *et al*, 2009). Much of this complexity relates to taught postgraduate study. Excepting the complication introduced by sub-doctoral research degree provision (see 2.3.1 above), research degrees are relatively homogenous in this regard. Doctorates are almost always three to four years full-time in duration (or longer part-time equivalent), examined by thesis and intended to prepare students for a career in research and/or in higher education.<sup>4</sup> Tuition is provided via individual supervision by at least one experienced academic. Funding support is available for some students, on a competitive basis via the UK Research Councils (the Department for Employment and Learning in Northern Ireland), from higher education institutions themselves and through private, public and voluntary sector sponsors.

However, within this broad framework, the nature of doctoral study can vary widely across disciplines. There are different disciplinary models of what doctoral study entails. In some natural sciences students are part of their supervisor's research team, providing assistance on a large project of which their own research is a component part. Doctoral study has much in common with the research work for which it is a preparation, based in a laboratory and working a full 9 – 5 working week. In humanities subjects students undertake a project of their own choosing and effectively work alone on this, with less frequent contact with their supervisor. Research is typically based in libraries or archives and a long thesis is produced. This is often called a 'lone scholar' model. Social science students might combine elements of both these approaches, perhaps with some data collection 'in the field' as part of their research. In this sense, doctoral study is an induction or apprenticeship perhaps for a particular discipline and needs to be understood in the context of the discipline in which it takes place first of all (Parry, 2007). Crucially from the perspective of this synthesis, there are different routes into research degrees which will vary by discipline. In some, professional experience is valued or even mandatory; in others a masters degree is usual; others still will assume immediate progression from a first degree. It is this latter model however which dominates the common image of a research student, even within higher education itself.

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<sup>4</sup> Although many students end up doing a range of other types of jobs in other sectors.

Similarly, research students are usually taken to be studying full-time. House (2010) reports 31 per cent of research students studying part-time in 2007/08. Looking at UK-domiciled students only, Artess *et al* (2008) show 37 per cent part-time for PhD and 48 per cent for masters by research in 2005/06. Part-time students are likely to be drawn from different populations to full-time students, are rarely funded by the research councils and may be older and pursuing research degree study for different reasons to full-time students. Again, there is variation by discipline; the proportion of part-time research students in 2006/07 ranging from almost fourth-fifths in Education to less than one-third in Mathematical Sciences (source: calculated from HESA, 2008, tables 1c and 1g).

### 3 RECRUITMENT TO RESEARCH DEGREES

#### Summary

- Growth in UK-domiciled research student numbers has been almost flat across the last decade. The main change has been an increase in numbers reported on PhD programmes offset by a decline in those recorded for masters by research.
- In the context of sustained growth at undergraduate and postgraduate taught levels, this stability can be thought of as a relative decline.
- No participation rate in postgraduate research programmes is published, but estimates of graduate progression into these qualifications is somewhere in the region of two to four per cent. Only about 1 in 200 of the working-age population hold a doctorate.
- There are substantial differences in progression to a higher degree by research by both subject discipline and institution of first degree.
- Very little is understood about applicants to postgraduate research programmes. Almost nothing is known about demand, competition for places, factors affecting success, relative popularity of different programmes and so on.

#### 3.1 Growth, stability or decline?

As noted in section 2.2, the trend in recruitment of UK-domiciled students to research degrees in the last decade or so has been one of relative stability. Numbers at doctorate level have held steady or grown very slightly, with numbers of masters by research students showing a decline, although it is not clear whether this represents changes in recording practices relating to those registered initially as MPhil students. In the context of overall growth in the number of first degree graduates *and* in the number of staff employed in higher education teaching and research, this stability might be seen as a relative decline. Artess *et al* (2008) report a 15 per cent increase in UK-domiciled undergraduate numbers from 2000/01 to 2005/06, in parallel with a mere one per cent increase in UK-domiciled first-year entrants to research degrees. Similarly, House (2010) shows increases in first-degree awards to UK-domiciled students from 1994/95 to 2007/08, accompanied by very little growth in research degree numbers.

Previous government reports, such as the Roberts Review (2002) on the supply of researchers in science, have been broadly concerned as much with quality of entrants as quantity. However in some areas there has been an apparent absolute shortage of new entrants to doctoral study in particular, prompting measures by the UK research councils to encourage entry to a PhD, principally through an increase to stipends. In this report we are concerned with entry to research degrees. Of course this is only half of the picture if the objective is to increase the number of those qualified to research degree level as it is also necessary for those who enter such programmes to complete them successfully rather than withdrawing or failing.

The government produces a participation rate for postgraduate study as a whole, similar to, but less well known than the Higher Education Initial Participation Rate (HEIPR). This reports the proportion of English-domiciled 17 – 30 year olds who have participated in postgraduate study for the first time for a given year. In the period 1999/2000 – 2007/08 this has consistently hovered around the eight per cent – nine per cent mark. The rate for females (11 per cent) is higher than that for males (seven per cent). These rates are substantially lower than the HEIPR, which was around 43 per cent for 2007/08 (Department for Innovation, Universities and Skills, 2009). No separate figure is produced for different types of qualification; therefore it is not possible to provide a rate of participation in research degrees for the whole population. Alternatives, such as the use of Census or other government survey data are not helpful in this regard: available Census outputs do not distinguish between under- and postgraduate qualifications as they aggregated all those with 'level 4' and 'level 5' qualifications (and in any case, the data is for 2001). In the Quarterly Labour Force Survey for third quarter 2009, 703 respondents out of 116,552 reported holding a doctorate (source: authors' calculations using ESDS 'nesstar' tool). This would mean about 0.6 per cent of the working age population are qualified to this level.

Although no research degree participation rate is available, it is possible to estimate the proportion of first-degree graduates who progress to a research degree as a 'first destination' using the Destination of Leavers from Higher Education (DLHE) survey.<sup>5</sup> Higher education institutions survey their recently graduated cohorts at a set date each year to ascertain the activities each graduate is now engaged in (such as employment, further study, looking after the home and so on). The survey and results are in standard formats which are then reported to the Higher Education Statistics Agency. Using DLHE it is possible to identify first-degree graduates who progress to a

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<sup>5</sup> The response rate to the survey varies annually within a range of approximately 83 per cent – 86 per cent.

higher degree by research as their 'first destination'. Unfortunately however this information is not readily available via HESA's published statistics and we must therefore rely on secondary analyses of this data which covers cohorts from several years ago. HEFCE (2005b) estimated that 2.4 per cent of undergraduate qualifiers from the 1995 and 1996 cohorts entered a higher degree by research as their first destination. Wakeling (2009a) found a mean rate of progression to higher degree by research of 2.1 per cent across the 2001/02 – 2004/05 cohorts. Those progressing immediately from a first degree to research degree study are in the minority among new entrants to research degrees. HEFCE (2009) reports about one-third of full-time PhD entrants in 2004/05 obtained a first-degree in the previous year. The majority of full-time PhD entrants had not been studying at either undergraduate or postgraduate level in the previous year. Among part-time entrants even fewer had been in higher education in the previous year (14 per cent). Purcell *et al*'s (2005) longitudinal study of around 9,000 1999 graduates found about four per cent had embarked on a PhD programme, a very similar rate of entry to 1995 graduates.

As for the future, if trends identified by Bedard and Herman (2008) in the USA are repeated in the UK, there may be an increase in doctoral registrations imminent. They found that recruitment is, in economic terms, counter-cyclical. That is when unemployment is low, so is enrolment in graduate school in the US (for both masters and doctoral degrees). The stagnation in recruitment to research degrees seen in the UK over the past decade may therefore be attributable to a period of low unemployment. As the financial downturn continues, it is possible that research degree recruitment will increase.

### **3.2 Subject differences**

Wakeling's (2009a) research also highlights the substantial differences in rates of progression to a research degree across subject disciplines and in the relative size of the undergraduate and postgraduate research student populations by subject, an analysis confirmed by Pollard *et al* (2008) in their detailed investigation of the destination of creative arts graduates. The mean rates of progression to research degree by subject discipline for 2001/02 – 2004/05 first-degree graduates show a very wide variation, from 0.2 per cent of graduates in Mass Communications, Business & Administrative Studies and Education to a comparatively huge 11 per cent in Physical Sciences (which covers physics, chemistry and similar subjects). Progression rates were highest in Science, Technology, Engineering and Mathematics (STEM) subjects and lowest in professional subjects. Historical and Philosophical Studies had the highest rate of progression to a research degree of a non-

STEM discipline. As noted in section 2.4, the model for entry to a research degree in some subject areas is increasingly via a research-training or other taught higher degree rather than directly from a first degree.

Wakeling (2009a) also shows that there is a shift in the distribution of students across subject discipline between first degree and postgraduate research levels with subjects popular among undergraduates such as Business & Administrative Studies or Subjects Allied to Medicine representing a far smaller proportion of research degree students. Looking at qualifications awarded, about four per cent of first degrees in 2007/08 were awarded in Physical Sciences, rising to 13 per cent of doctorates in the same year; conversely, more than ten per cent of first-degree awards were in Creative Arts & Design but this area accounted for only about two per cent of doctorates granted (source: calculated from HESA, 2009, table 14). House (2010) shows that the rate of growth of full-time equivalent research student numbers across different subject disciplines for 2002/03 – 2007/08 varies considerably, with growth strongest in STEM subjects. This growth includes non-UK-domiciled students; House remarks that it probably reflects the greater availability of research council funding for STEM subjects.<sup>6</sup>

### **3.3 Differences in institutional location<sup>7</sup>**

Just as there are substantial shifts in the balance of subject disciplines between undergraduate and postgraduate research degrees, so there are also large shifts in the institutional location of students. Research students tend to be concentrated in a relatively small number of institutions, although all universities and most other higher education institutions have some activity (House, 2010; Sastry, 2004a; Wakeling, 2009a). As noted in section 2.2.2, this is a controversial area at present as different institutional ‘mission groups’ argue for and against concentration of funding for research and for research degrees. It is clear however that the Russell Group dominates research degree provision, with all ten of the institutions with the largest number of research students belonging to the Russell Group in both 2000/01 and 2007/08 (House, 2010). Indeed our analysis of HESA data for 2006/07 shows that Russell Group institutions took up 19 of the top 20 places for size of research student population and that the University of Cambridge alone had more research students than all Welsh institutions combined. In contrast, the Russell Group accounted for only about 19 per cent of undergraduates in 2007/08.

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<sup>6</sup> There is also a greater availability of funding in certain science subjects from large charitable foundations such as the Wellcome Trust.

<sup>7</sup> Section 5 below discusses the mobility (or not) of graduates of different kind of institutions between undergraduate and postgraduate research degree level.

### 3.4 Application and entry

Entry to research degree study for an individual student is usually conditional on several factors. A student is generally expected to have suitable prior qualifications (usually an upper second class honours degree or higher); to have some way to pay for tuition; and for there to be a member of academic staff available in the school or department concerned who has sufficient knowledge to supervise the proposed research project. Each person who wishes to study towards a research degree needs to submit an application to the institution(s) where they would like to study who will then assess their suitability for admittance.

At undergraduate level there is a national system – the Universities and Colleges Admissions Service or UCAS – which processes applications for full-time undergraduate study and records data about the number of applicants, the courses applied to and the characteristics of the applicants. A similar system applies for application to postgraduate teacher training courses in England and Wales. For other postgraduate courses, be these taught or research, there is no such national system. This means it is not possible to determine how many people apply for entry to postgraduate research degrees each year, nor what the characteristics of applicants are. We are only able to determine the characteristics of *entrants* to research degrees via the HESA Student Record. Whilst UCAS does run an application service for postgraduates (UKPASS), this is by no means national in its coverage. At present, only 22 institutions use the service, none of which are among the major providers at research degree level. It is possible to apply for research degrees via UKPASS, but given the small number of institutions involved and the low volume of applications for this activity they are likely to receive, such data might not be especially helpful. Nevertheless, UKPASS were contacted for advice and statistical information (unlike UCAS and the Graduate Teacher Training Registry, they do not make statistics publicly available on their website). No response was received to this request.

It is thus not possible accurately to determine, in a sophisticated manner, the level of *demand* for postgraduate research study, only the level of recruitment to such programmes. Some of the potential barriers of access to postgraduate research which are identified in this report might be the result of inequalities in the application process; without the necessary data, this cannot be investigated further. Studies of widening participation at undergraduate level have highlighted the application process as a potential source of disadvantage for certain applicants (Boliver, 2006; Reay *et al*, 2005; Shiner and Modood, 2003; The Sutton Trust and BIS, 2009; Zimdars *et al*, 2009) and it is therefore

important that research into this area is conducted in future.<sup>8</sup> Institutions themselves keep records of applications for research degree study which may be a potential source of data for such an investigation. The *Futuretrack* study of 50,000 UCAS applicants in 2005 which is being conducted by the Institute for Employment Research at the University of Warwick ([www.futuretrack.ac.uk](http://www.futuretrack.ac.uk)) represents a potential model (and indeed will provide interesting results of its own about progression to postgraduate study from its next phase).

Interestingly, although there are now a good number of 'self-help' texts available for research students which cover how to 'survive' such programmes through organising time, securing financial support, managing the relationship with a supervisor, coping with disappointments and so on, few if any of these deal specifically with the application and entry process. Instead they start at the point that a student has begun the programme. The sole exception is Bentley's (2006) *The PhD Application Handbook*; Bentley comments (p. 1) that

PhDs are not widely advertised in the same way as undergraduate degrees. Applying for a PhD is still a bewildering and complicated process. A surprising number of people still have no idea what a PhD is at all.

There is no real understanding of how potential research students find out about study opportunities and funding opportunities, how they decide whether and if so where to apply and so on. There are of course technical difficulties in identifying those considering postgraduate research: undergraduate finalists are straightforward to sample via their institution, but those returning to study are a diffuse group.

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<sup>8</sup> Small-scale studies of transition to taught masters degrees were conducted by Bowman (2005) and Donaldson and McNicholas (2004) but we know of no such study for entry to research degrees.

## 4 MOTIVATIONS FOR ENTRY TO POSTGRADUATE RESEARCH

### Summary

- There are indications that 'credential inflationary' pressures will lead to rising enrolments in postgraduate research, but it is unlikely that there will be mass participation in such qualifications.
- Studies of finalists' motivations for entering a research degree suggest there is a difference between intention to do so and actual enrolments. Interest in the subject appears to be more important than career advancement in motivating entry.
- There seems to be little understanding of or engagement with aspirations in relation to research degrees. Likewise the existing data on motivation to enter a higher degree by research collected by the DLHE relates only to those who have made this transition and does not tell us about non-participants.
- On balance, there would appear to be both financial and non-financial benefits accruing to doctoral graduates. There is no research on whether these are accurately perceived by potential research students.
- The image of doctoral study portrayed by the PhD 'self-help' literature may be counter-productive for widening participation in research degrees; if accurate, this image might suggest a need for reform to the nature of the qualifications.

### 4.1 Natural limits to postgraduate research student numbers?

As made clear in section 3.1, enrolling on a research degree programme is a relatively uncommon activity. Although traditionally it has been thought of as leading to a narrow set of careers, this perception has been challenged recently by research which shows a variety of career destinations for research degree graduates. In some subjects the proportion of doctoral graduates employed in research is very low (seven per cent in Theology, nine per cent in Law, ten per cent in Education). Just under one-half of all doctoral graduates are employed in the education sector, falling to less than 40 per cent of graduates for some disciplines, such as Psychology, Chemistry and Engineering (Haynes *et al*, 2009).

Nevertheless, despite this diversification, it remains the case that research degree graduates generally enter a quite defined group of professions. Research degrees involve a significant investment of time and energy on a narrow project. They are thus highly unlikely to appeal to a large number of people. At the risk of repeating the folly of reports in the past which have cast doubt on the possibility of higher education participation expanding past a certain rate, it is probably safe to say that research degrees will never become a mass activity, at least not whilst research degree students receive individual supervision. It would simply not be economically viable to offer such tuition on a mass scale. Although there has been little increase in home student numbers in recent years, there is doubtless scope for widening participation. In considering how and whether there is a need to encourage a broader participation in postgraduate research programmes, it is important to understand what motivates or discourages people from pursuing such qualifications.

Moreover, there are general trends in education enrolment from which research degree study may not be immune. Sociologists have long understood the process of 'credential inflation' (Collins, 1979), whereby increasing enrolments at one educational level 'spill over' into higher enrolments at the next level as people try to increase their competitive advantage over other qualification holders. As Bowl (2003, pp. 152 and 146) notes:

A postgraduate qualification is therefore becoming increasingly important, whereas 20 years ago a first degree would have opened the door to improved prospects...[A]s credential inflation continues, the second degree becomes the new benchmark.

Tomlinson (2008), in a study of 53 final-year undergraduates at a pre-1992 university, reported strong perceptions among the group that 'the degree is not enough' and that graduates needed to distinguish themselves from others through work experience or further study. At present, this pressure would appear to be mainly on taught postgraduate places. However this may in time extend to research degree level. Economists have also pointed to 'overqualification' trends in the UK labour market, whereby workers have higher qualifications than those needed to do the job (eg Brynin, 2002; Chevalier and Lindley, 2009; Dolton and Silles, 2001). There is always a possibility therefore that doctorates will be used increasingly to gain entry to careers outside of those for which they are traditionally intended as a preparation.

## 4.2 Studies of motivation for postgraduate research study

### 4.2.1 *Motivation for immediate progression to postgraduate study*

British evidence in this area is mainly limited to surveys of final-year undergraduates, who do not form, as noted above, the majority of entrants to research degrees in the subsequent year. Evidence from HESA's DLHE survey shows that those progressing to research degrees are more likely than other postgraduates to cite an interest in their first degree subject as a reason for continuing to study and slightly less likely to cite career-oriented reasons for their choice (Wakeling, 2009a), but that is hardly a surprising finding! Nor does it appear that there are differences in the reported motivations by background characteristics such as socio-economic class. Wakeling conducted a survey of current postgraduates, including research students, using the same questions about reasons for entering postgraduate study as used by the DLHE survey, but found no interesting differences between the two groups.

There are potentially two weaknesses in using DLHE data in this way. The first is that the questions asked may not be the most appropriate for establishing students' motivation, since it is possible to select several different reasons for entering further study. Respondents are not forced to pick the most important reasons, so it is perhaps no surprise that many agree that they were interested in the content of the course and wanted to improve their career options. Secondly, as the DLHE survey asks the questions only to those who have entered further study there is no way to determine whether their motivations differ from those who did not do so.

Three studies have investigated large samples of graduating students to ascertain their views on postgraduate study, including postgraduate research. A study conducted by the University of Sheffield for the former Office of Science and Technology (OST, 2000; Phillips, 2000) investigated the intention to enter postgraduate study of over 6,000 final-year undergraduate students in 2000. It should be noted that this cohort entered higher education prior to the introduction of undergraduate tuition fees and that the study did not determine whether the students' intentions were followed through into actual application and enrolment. Nevertheless, the study provides perhaps the largest survey of the attitudes and motivations of prospective research students we were able to find. Over one-quarter of respondents envisaged taking postgraduate study, which varied from a high of 49 per cent in Geological Sciences to a low of 19 per cent in Information Technology. Among those intending to pursue postgraduate study, 81 per cent of physicists intended to take a doctorate, but only five per cent of economists. Almost all those intending to pursue doctoral study cited an interest in the subject as an

encouragement and this was the biggest motivation for those intending to take a doctorate. The majority also saw an academic career as a motivating factor too. Earning potential was a major factor, but relatively less important. Negative reasons for entering further study, such as not knowing what else to do or wishing to stay in the same location were rarely mentioned.<sup>9</sup> Most of those stating they would not apply for a postgraduate research degree were purposively opting to enter employment immediately rather than being 'put off' postgraduate research for any reason.

There is a clear disparity here: if only about 2.4 per cent of graduates progress immediately to a research degree, but ten times that figure intend to do so, then it would appear that a large number of potential research students are 'lost' after graduation. However since there was no analysis of non-response to the survey, we can assume that students who were positively disposed towards postgraduate education in the first place were more likely to respond: this is a common feature of self-completion surveys (Dillman, 2007). That said, it may be that there is indeed some such attrition, even if it is unlikely to be quite so severe. To establish this definitively it would be necessary to track those stating an intention to enter research degree study to see if they actually do so. Such an investigation could also compare the characteristics (gender, ethnicity, social class and so on) of students to see if some groups are more likely than others to realise their ambitions.

Stuart *et al* (2008) investigated attitudes towards postgraduate study among final-year undergraduates in two post-1992 universities in southern England. A number of key findings from this project, which surveyed over 1,000 students, are discussed in later sections. Looking specifically at findings about students' reasons for continuing to postgraduate study or not, many students expressed a desire to take a break from higher education, viewing studying as a stressful activity. A substantial group of respondents had a preference for work experience and immediate entry to the labour market and so another major finding of the study – that students on theoretical degrees were more likely to expect to progress to further study than those on professional/practical courses – comes as no surprise. It must be noted that the students surveyed were attending post-1992 institutions which have traditionally had a more vocational focus; this might account for some of the preferences expressed by the students (who had already opted into institutions with those aims).

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<sup>9</sup> Respondents to the DLHE were also unlikely to cite 'negative' reasons for continuing in postgraduate study. Whether this is a valid reflection of the real situation, we cannot tell, but is well known that survey respondents tend to portray themselves in a positive light (Dillman, 2007).

In their longitudinal study of 8,600 1999 graduates, Purcell *et al* (2005) reported a number of motivations mentioned by graduates who had entered postgraduate study (although they did not report why non-participants had not entered postgraduate study). These included developing further skills and knowledge for use in employment; an awareness that postgraduate qualifications were required for entry to a particular profession; and in some cases, as a delaying tactic when the graduate was uncertain about what to do after their undergraduate degree. Whilst there were some differences in motivation by age and gender, it is not clear whether this affected those entering research degrees to the same extent as those entering other postgraduate courses (the latter being in the majority in the sample).

#### 4.2.2 *Other studies of motivation*

A study for the NPC (Darwen *et al*, 2002) of just under 1,000 postgraduate students found that improvement to career prospects and a desire to continue studying were the most important reasons for entry to postgraduate study. However since this study did not survey non-participants, suffered from a low response rate (12 per cent) and did not separately identify the motivations of research students, it is perhaps less helpful than the studies of finalists discussed in section 4.2.1.

Smaller scale studies show that most of those entering postgraduate study are doing so for work-based reasons. Brooks and Everett (2008) interviewed 90 graduates, finding a focus on continued education and training associated with professional development and progression rather than for learning for its own sake. The respondents expressed a desire to undertake 'leisure learning' (which could conceivably include a research degree), but were not in a position to do so given their other commitments. Of course with a small sample it is not surprising that research degrees were not mentioned. The findings suggest that graduates will look to the extrinsic benefits of research degree study in the first instance. Leonard *et al* (2005) investigated the motivations of three cohorts of doctoral graduates in Education. They found that motivations were as much about the intrinsic benefits of such study as they were about professional development.

#### 4.2.3 *Aspirations*

Research into widening participation at undergraduate level has often identified different aspirations among different groups. The simple association of low aspiration with underrepresented groups has been challenged, especially with reference to minority ethnic groups (see for example Modood, 1998; Connor *et al*, 2004; Mirza, 2006). Others have shown

that differences in participation by socio-economic class are largely due to differential attainment rather than aspiration (Chowdry *et al*, 2008; Gorard, 2005). However there is also some evidence that applicants from less privileged backgrounds are less likely to apply to the most prestigious universities, holding the level of attainment constant (Reay *et al*, 2005; The Sutton Trust, 2004). It is certainly the case that funding for widening participation at undergraduate level has been directed at programmes intended to 'raise aspiration'. The 'AimHigher' programme, for instance, is intended to target pupils in areas of low higher education participation (so-called 'cold spots') to promote the benefits of further study and to dispel some of the myths connected to university-level education. Such interventions increasingly involve children in the later stages of primary and early stages of secondary schooling. Recent evidence shows an improvement in participation rates for disadvantaged groups (those in 'low participation neighbourhoods' and from the lower socio-economic classes) (HEFCE, 2010), although it is not clear that this improvement is as a direct result of investments in widening participation (National Audit Office, 2008; Gorard and Smith, 2006).

Understanding of aspirations in relation to postgraduate study, particularly as they develop or not prior to the final year of undergraduate study, is scant. There appears to be very little research in this area. What little research there is (discussed above), tends to concentrate on taught higher degrees, or is now quite old.<sup>10</sup> This would also appear to be an area to which, until very recently (and probably then only as a reaction to the Postgraduate Review commissioned by BIS), higher education institutions have paid very little attention.<sup>11</sup> Higher education institutions generally have well-resourced widening participation operations which have developed out of traditional schools liaison functions. Such apparatus does not really exist at research degree level and it is unclear how institutions promote research degree study within their own institution and beyond. In the absence of research evidence in this area, it is plausible to assume that there is variation in practice within and across institutions.

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<sup>10</sup> See for instance Pratt *et al* (1999) and Hesketh and Knight (1999), which address postgraduate marketing and decision-making, but which was written before the use of the internet as an information source about postgraduate opportunities was commonplace.

<sup>11</sup> It is worth noting that HEFCE's (2004) 'widening participation and fair access research strategy' plays down the importance of access to postgraduate study and its more recent update of this strategy (HEFCE, 2008) does not mention the area at all. Analysis of Widening Participation Strategic Assessments shows that "over 85% of English HEIs do not consider widening participation in relation to postgraduate study" (Thomas and McCulloch, 2010, p. 5).

A further consideration is the point at which a student decides to enter research degree study. Those entering at different ages may have different aspirations. Doctoral study in particular may be something undertaken to qualify for initial entry to a career following a first degree; it may be taken to enhance career progression or professional development in an existing career; or it may be taken as a means of changing career altogether. Students following these different routes, in addition to their different age profiles, may also be funding their study in different ways and studying in different institutions in different modes (eg full or part-time). Wakeling's (2009a) survey of over 2,000 postgraduates showed a variety of routes into research degree study.

### **4.3 What are the benefits of a postgraduate research degree?**

#### *4.3.1 Intrinsic and extrinsic motivations in response to benefits*

To understand better students' motivations for studying for a research degree, it is helpful to understand the nature and extent of benefits which accrue to those in possession of a research degree. Promoting the benefits of higher education has been a key strategy in widening participation initiatives at undergraduate level. This has often been a controversial area, particularly in the calculation of the financial returns to undergraduate qualifications and the use of this data in debates around the increases in tuition fees for undergraduate study in England eventually introduced in the Higher Education Act 2004. However other benefits of studying have been emphasised. Simply translating this discussion from undergraduate to postgraduate research level is problematic because of the nature of qualifications at the two levels. Research degrees, especially the doctorate, arguably rely on the student having an intrinsic interest in pursuing them. That is, the PhD dissertation requires very detailed and sustained engagement with a narrow project, so we might expect that a student will need an interest in the topic *for its own sake* in order to be successful. There may also be an element of extrinsic motivation, with the research degree as a stepping stone to a particular career. Having noted the paucity of research on motivations for entry to a research degree however, such assumptions about intrinsic and extrinsic incentives should be treated as a working hypothesis and no more.

#### 4.3.2 *Financial benefits*<sup>12</sup>

Until recently, the consensus on the financial returns to research degree study was that it did not offer any significant advantage. Rudd (1986, 1990) investigated the return to those qualified to doctoral level in the natural and social sciences respectively, finding that there was no advantage over the course of a career. Whilst it appeared that doctoral graduates did eventually come to command an earnings premium over their closest comparators (graduates with a first-class honours degree only), the size of the premium was relatively small and it barely made up for the loss of earnings arising from time taken out of the labour market to complete the doctorate. A similar finding emerged from Dolton *et al* (1990).

The latest research on the financial returns to doctoral study paints a different picture. O'Leary and Sloane (2005) used pooled Quarterly Labour Force Survey data to create a large sample with which to investigate the effect of different qualifications on earnings. They separately identified those with a PhD and also investigated differences between subject disciplines. Their results show a substantial earnings premium for both men and women PhD-holders above first degree graduates alone. There was a small but statistically significant advantage over masters graduates too. The earnings premium for women was much larger than for men (across all the higher education qualifications), which might be related to the relative scarcity of postgraduate qualifications in the older working-age population. There were also differences by degree subject too, with a PhD in some areas (notably medicine and business) providing a distinctly better rate of return than a first degree. In a few areas, such as Education, men with a doctorate experienced a *negative* rate of return. This study's findings were replicated by Machin and Murphy (2010), also using Labour Force Survey data, and showing lifetime earnings of £1.9 million for PhD-holders, a greater amount than masters graduates (£1.75 million) or first-degree graduates (£1.45 million).

There are several reservations about these findings however. First of all, past returns on qualifications are not necessarily a guide to future benefits since they accrued in very different circumstances. Secondly, unlike Rudd, later comparisons of the earnings associated with doctorates compared to other higher education qualifications do not necessarily compare like with like. For a more meaningful comparison, doctoral graduates should be compared perhaps with first-degree graduates who are in-principle qualified to enter

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<sup>12</sup> A more detailed analysis of the rate of return to doctorates is provided in Raddon and Sung's (2009) research synthesis of the career choices and impact of doctoral graduates (see section 5 of their report).

doctoral study – ie they have an upper second or first class honours degree.<sup>13</sup> Finally, and most importantly, it is by no means clear that these financial benefits are recognised by potential entrants to research degrees.

#### 4.3.3 *Non-financial benefits*

Research for HEFCE has identified a range of benefits associated with graduate status. Bynner and Egerton (2001) and Egerton (2002) show graduates are more likely to have high-status jobs, good physical and mental health and stronger ‘civic engagement’ than non-graduates. Although we could find no British research examining non-financial benefits for research degree graduates, a study in the US did find some of the non-financial benefits applied more strongly to postgraduates (Perna, 2004). There is clear evidence that doctoral graduates are less likely to be unemployed than those holding other qualifications (Haynes *et al*, 2009; Machin and Murphy, 2010) and certainly good anecdotal evidence that doctoral graduates enjoy their work and have good working conditions (UK Grad Programme, 2004). A Swiss study found similar financial and non-financial benefits to doctoral study (Engelage and Hadjar, 2008).

### 4.4 **Perceptions of doctoral study**

#### 4.4.1 *Benefits and background characteristics*

Research at undergraduate level has shown differences in labour market outcomes vary not only according to first-degree attainment, subject discipline and institution, but also, holding these academic factors constant, to graduates’ background characteristics (socio-economic class, gender, ethnicity and so on) (Brennan and Shah, 2003; The Cabinet Office, 2003). We found no research which investigated the returns to postgraduate research degrees conditional on the background characteristics of those holding such qualifications, except for gender (see section 4.3.2). Nor do we know whether perceptions of the value of postgraduate research study – whether it is seen as worthwhile and why – also differ by these background characteristics. Research in this area would be helpful if some of the techniques used for widening participation at undergraduate level are to be considered for use for encouraging entry to research degrees among underrepresented groups (if that is found to be required).

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<sup>13</sup> Machin and Murphy (2010) did compare first-class graduates with postgraduates and found a premium in starting salaries, but they did not separate out doctoral graduates.

#### 4.4.2 *The image of doctoral study*

As a final observation in this section, it would be worth investigating whether the format and structure of postgraduate research study acts as a disincentive to potential students in general or from particular backgrounds. The impression one is given from reading the self-help 'how to get a doctorate' literature is that postgraduate research is difficult, mysterious, challenging, at times distressing, often lonely and, in some cases, little short of a trial-by-ordeal! This can be seen in the titles given to some of the books, where 'survival' and the 'hidden recipe for success' are common themes:

- *The Unwritten Rules of PhD Research* (Rugg and Petre, 2004)
- *Getting a PhD: an action plan to help manage your research, your supervisor and your project* (Finn, 2005)
- *Your PhD Companion: the insider guide to managing the practical realities* (Marshall and Green, 2010)
- *Mastering your PhD: survival and success in the doctoral years and beyond* (Gosling and Noordam, 2006)
- *How to Survive your PhD: the insider's guide to avoiding mistakes, choosing the right program, working with professors, and just how a person writes a 200-page paper* (Karp, 2009)
- *Demystifying Postgraduate Research: from MA to PhD* (Grix, 2001)
- *How to Survive Your Doctorate: what others don't tell you* (Matthiesen and Binder, 2009)
- *Getting your PhD: a practical insider's guide* (Churchill and Sanders, 2007)

It seems to us that there are two implications for widening participation here. The first is the impression that this 'discourse' of difficulty, whatever its basis in reality, gives to potential doctoral students.<sup>14</sup> Research on initial access to higher education shows that potential students are put off by things they perceive to be too difficult or alien to them; this does not affect students from all backgrounds equally however and may lead to students without direct knowledge of postgraduate study to be put off more frequently. The second impression is that there may be something in the way research degree study is conceived and organised which creates the problems often reported by research students. Despite frequent and quite strident criticisms of doctoral education (eg Hinchey, 2000), initiatives such as the 'new route' PhD ([www.newrouteph.d.ac.uk](http://www.newrouteph.d.ac.uk)) appear to have had little impact on the form of doctorates, which remain tied to a kind of disciplinary apprenticeship, largely

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<sup>14</sup> Bentley (2006, p. 2) states baldly: "You have to be a little strange to want to do a doctorate. You'll be giving up the chance to earn some real money in a steady job, for several years of little or no money".

as described by Parry (2007). As Burke and Jackson (2007) have pointed out with respect to lifelong learning more generally and O'Donnell *et al* (2009) for postgraduate study in particular, the instinctive response to calls for greater diversity in higher education has been to try to change the students rather than to investigate whether there are aspects of the 'product' which discourage diversity.

## 5 ACADEMIC FACTORS AFFECTING ENTRY TO RESEARCH DEGREES

### Summary

- Attainment is the most important determinant of entry to a research degree.
- There are inequalities in degree-level attainment by ethnicity, gender and socio-economic class which are likely to affect underrepresented students' access to research degrees.
- There is an absence of evidence on switching subjects between first degree and postgraduate research degrees. This needs to be better understood.
- Evidence suggests that access to postgraduate research degrees is strongly correlated with attendance at certain kinds of institutions, particularly a Russell Group university. Whether this is fair or not is open to debate.
- Further research is also needed into patterns of student mobility between institutions at postgraduate research degree level and the time taken between completion of the first degree and entry to a research degree.

### 5.1 Attainment and entry to research degrees

#### 5.1.1 *Research degree entry requirements*

It is clear that the most important factor affecting entry to undergraduate study is educational attainment. Several large-scale studies have shown that inequalities in access to higher education by socio-economic class, ethnicity, gender, type of school attended (state or independent) and so on can largely, if not entirely be explained by students' attainment in 'level 3' qualifications such as A-levels, BTEC National Diplomas and so on. Gorard (2005) showed that nearly all of those qualified to enter higher education in Wales through holding level 3 qualifications actually did so, meaning that any inequalities in access were due to inequalities in attainment at school. In a larger study, Chowdry *et al* (2008) studied the entire cohort of pupils in English state schools who were in Year 11 in 2001/02. They also found inequalities in access to undergraduate study, with 'materially deprived' pupils less likely to enter

and less likely to attend prestigious universities if they did. Again however these inequalities were almost entirely associated with differential attainment between deprived and non-deprived groups.

Entry to a research degree typically requires a student to possess an upper-second-class honours degree in an appropriate subject. In some disciplines it is increasingly the case that first-class honours are a prerequisite for obtaining funding support and there is also an increasing expectation in many disciplines, that doctoral students will hold a masters degree on entry (see the discussion in section 2.3.1). In a few disciplines, the requirement for a 2.1 degree may be less stringently applied because of low demand for research degree entry (anecdotally we are aware that this is the case in some natural science subjects). It is not clear whether entrants to masters by research are usually expected to hold a 2.1 in their first degree. In general though, a 2.1 is the benchmark: Wakeling (2005a, 2009a) found a very strong association between first or upper-second-class honours attainment and progression to a higher degree by research (and conversely only very few graduates with less than a 2.1 made the transition). The Office of Science and Technology (OST) study of final-year undergraduates showed an association between A-level points score and intention to pursue doctoral study (OST, 2000).

### 5.1.2 *Inequalities in degree-level attainment*

There are known differences in degree attainment according to most of the major axes of educational inequality: socio-economic class; ethnicity; gender; school type etc. Thus if there are inequalities in access to research degree study, these might be largely attributable to differences in attainment at first degree level. Smith and Naylor (2001; 2005) investigated factors associated with the attainment of different degree classifications among the entire UK cohort of those completing a first degree in 1993 and 1994/95. They showed that students from less privileged socio-economic classes were less likely to obtain a 'good' degree (first or upper second). However they also showed that, holding A-level results equal, students from state school were more likely to attain a good degree than those from independent schools, a finding replicated by Bekhradnia and Thompson (2002) and McNabb *et al* (2002).<sup>15</sup> This implies that attainment is not necessarily an accurate measure of ability; if we carry this forward to entry to research degrees, it might mean that students from certain backgrounds are 'underachieving' at first degree level, which would block their entry to research degree study.

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<sup>15</sup> Recall that Chowdry *et al* (2008) did not include independent school pupils in their study.

Women are more likely to attain a good degree than men (and have been since at least 1978); men are still more likely to attain first class honours although the gender gap on this measure is getting smaller over time and degree results do appear to correlate with attainment at prior levels (Barrow *et al*, 2009; Richardson, 2008a).

Research on the degree-level attainment of ethnic minority graduates gives the greatest cause for concern. Here there is a clear and consistent trend for students of White ethnicity to obtain good degrees at a higher rate than graduates from any other ethnic group (Connor *et al*, 2004; Leslie, 2005; Broecke and Nicholls, 2007; Richardson, 2008a). Richardson (2008b) shows that about half the difference in degree-level attainment between the White and other ethnic groups cannot be accounted for by other factors such as prior attainment. These apparent inequalities in attainment are likely to cause those from ethnic minority groups to fall at the first hurdle of entry to a research degree, that is the possession of a good degree.

## 5.2 Subject differences

Differences in the patterns of entry to research degrees were discussed in sections 2.4 and 3.2. The widening participation 'problem' may be different in different subject areas. In the STEM subjects, where student funding at doctoral level is relatively well provided, concerns have been expressed about the overall demand for research degree study from UK students (The Royal Society, 2008) and about access by women (such as the funding of the UK Resource Centre for Women in Science, Engineering and Technology)<sup>16</sup> and ethnic minority graduates (Elias *et al*, 2006). By contrast, in creative arts subjects, concerns are related to the suppression of demand arising from a lack of available funding; doctoral students are more likely to be older and male (Ball *et al*, 2010; Pollard *et al*, 2008). In humanities disciplines, where funding is also quite scarce, doctoral students were found to be mainly career changers motivated by an intrinsic interest in their research rather than increased earnings (Council of University Deans of Arts and Humanities, 2002). A study of 130 social work doctoral students found most were either social workers or social work educators aged 40 and over (Scourfield and Maxwell, 2009).

Whilst these detailed studies of individual disciplines or of broader subject areas give some indication of the issues in relation to access to doctoral study in those areas, we could find no research which establishes the overall flow of doctoral entrants within and across subject disciplines. Mills *et al* (2006) show

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<sup>16</sup> See <http://www.ukrc4setwomen.org>

that, in terms of academic employment some disciplines in the social sciences are 'exporters' and others are 'importers'. That is, in certain subject areas, many of the academic staff obtained their doctorate in another social science subject – Business Studies is an obvious example of an importer, as many academics working in business school trained in psychology, economics, sociology and so on. Sociology is a large exporter, as its PhDs can be found in many other subjects. What we do not know is how far this export/import model can be applied to the natural sciences, humanities and so on; nor whether the same thing occurs in entry to doctoral study. It is highly likely, for instance, that the Medicine and Dentistry subject area is a large importer of doctoral students because it is one of the largest subjects at doctoral level, but it is known that the rate of progression from an undergraduate degree in medicine to a higher degree by research is very small indeed (Wakeling, 2009a). It is important to understand these flows, both from the perspective of social justice and from that of sourcing the widest possible pool of talent for research degrees.

### **5.3 Institutional differences**

#### *5.3.1 Institutional types in UK higher education*

The shift in institutional location of students between first-degree and research-degree levels was made plain in section 3.3. In this section, we review whether first-degree institution affects entry to a research degree; and whether students remain in or move institution for postgraduate research. Researchers have pointed to a process of 'stratification' of higher education, whereby universities are accorded different levels of prestige which are associated both with more stringent entry requirements and more positive graduate outcomes. However this 'academic' stratification is typically accompanied by social stratification too, with certain kinds of students being underrepresented in the more prestigious institutions. The process of institutional stratification appears to have occurred in higher education systems across the world, even though these systems can be quite different to each other (Shavit *et al*, 2007). In the UK, although the 'binary' divide of universities and polytechnics has been formally dissolved, there are informally recognised differences in status between types of institution. Increasingly these are reflected in the 'mission group' to which most higher education institutions now belong, organisations which represent a set of institutions which self-identify with a particular sector of higher education. There are now five main mission groups in UK higher education: The Russell

Group, 1994 Group, University Alliance, Million+ and GuildHE. Some institutions are not affiliated with any group.<sup>17</sup>

### 5.3.2 *Inequalities in entry to research degrees by institution type*

Critics have suggested that institutional inequalities undermine efforts to promote equal opportunity in higher education (eg Ainley, 1994; Leathwood, 2004). At undergraduate level it is certainly well known that women, students from lower socio-economic classes and minority ethnic students are underrepresented in some institutions - notably those in the Russell Group - but not in others, typically the post-1992 universities (Connor *et al*, 2004; National Audit Office, 2002).

It is certainly the case, as set out in section 3.3, that research student numbers are concentrated in Russell Group universities in particular, and pre-1992 universities in general. House (2010), in her overview of UK postgraduate education, shows that graduates from Russell Group and 1994 Group institutions are more likely than those from other institutions to progress to a research degree. Wakeling (2009a) showed that among graduates from 2001/02 to 2004/05, type of institution attended was a significant predictor of progression to a higher degree by research, controlling for subject discipline, degree classification and students' background characteristics. This was consistent with findings for an earlier cohort (Wakeling, 2005a). On a smaller scale, Zimdars' (2007) study of a cohort of new postgraduates at the University of Oxford suggested that the prestige of the first-degree institution was an influential factor in securing their entry to Oxford. Thus graduates of the institutions with higher status are more likely to proceed to further study; research students as a whole are more likely to be based in these institutions too. Less is known about the institution attended by postgraduates who did not proceed immediately to a higher degree by research. Wakeling (2009a) found an overrepresentation of Russell Group students at postgraduate level at all eight institutions in his sample, regardless of their type. However the sample was not constructed in such a way to allow inferences to be made at the national level. A US study of 10,000 1992/93 graduates came up with similar results: college quality was strongly correlated with progression to doctoral study (Zhang, 2005; see also Nevill *et al*, 2007).

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<sup>17</sup> The Russell Group comprises 20 large, research-intensive and generally older institutions. The 1994 Group is made up of smaller and newer research-intensive universities. University Alliance membership includes generally larger and newer institutions which are research active whereas Million+ institutions are, in the main, new universities with a teaching focussed mission. GuildHE mainly represents institutions which were previously higher education colleges.

There is a question as to whether these differences in the first-degree institution of research degree students should be considered *unfair*. In an American study of two universities' graduating cohorts, Hearn (1987) found that faculty-student interaction and departmental context were strong predictors of undergraduates' intention to pursue graduate study. The results of successive Research Assessment Exercises in the UK show that the highest-rated departments for research are concentrated in Russell Group, and to a lesser extent 1994 Group institutions. Although the most recent RAE identified 'islands of excellence' in newer universities, the overall picture has remained quite similar across the last 20 years or so. It is perhaps not very surprising then that graduates from research-intensive institutions which are academically selective are more likely to enter research degree study. Students at research-intensive universities are already selected on ability; moreover they have self-selected into institutions with a more 'academic' focus. Their pre-entry dispositions will doubtless be reinforced during their undergraduate studies due to the nature of the department and/or institution they are enrolled in. Similarly, those attending universities with a history in the polytechnic tradition will face the same cultural influences (and self-selection) with regard to vocational/professional education. It is perhaps not surprising that more such students will seek employment and eschew research degrees.

This argument will be revisited in section 7 below on access to research degrees and socio-economic class, but there are reasons to treat it sceptically. As Zhang (2005, pp. 335 – 336, emphasis added) concludes:

*Ceteris paribus*, students from wealthier and better-educated families have advantages in obtaining graduate education. Nonetheless, other factors are *not* equal. Previous research has shown that students from wealthier and better-educated families generally have higher test scores and are more likely to obtain degrees from high quality colleges. In other words, some socioeconomic factors have been *crystallized* in the student's intellectual ability and educational credentials. This indirect effect, through the tight connection between socioeconomic factors and educational attainment, is also substantial. [...] It appears that socioeconomic factors such as family income and parental education exert great indirect effects on graduate education through their impact on individuals' intellectual ability and educational credentials.

Brooks (2006), reporting on her interviews with 90 graduates, found that, with a few exceptions, postgraduate decision making was influenced by questions of institutional status, both that of the graduates' first-degree institution and that of potential postgraduate institutions.

### 5.3.3 *Institutional mobility from undergraduate to postgraduate research degrees*

Very little is understood about the pattern of institutional mobility (or not) between undergraduate and postgraduate level. Around 40 years ago, Rudd (1975) found nearly three-quarters of UK research students in his sample of about 1,000 postgraduates at eight universities had remained in their first-degree institution. Thanks to HEFCE's recent research, it is now known that only 36 per cent of full-time UK-domiciled research students starting in 1999/2000 had attended the same institution in the previous year either at first-degree or masters level. However no indication is given as to variation in this statistic by subject discipline, gender, type of institution etc. It is also not known what proportion of starters attended the same institution, but not in the previous year. Zimdars' (2007) study at Oxford found 37 per cent of new graduate students had taken their first degree at Oxford. Looking at DPhil<sup>18</sup> students, 51 per cent had studied previously at Oxford or Cambridge (no figure for Oxford alone is given). Only eight per cent of new DPhil students had attended new universities. In the Sheffield study of final-year undergraduates at different institutions, 42 per cent of those intending to pursue doctoral study envisaged changing institution, 32 per cent did not; 11 per cent did not know; and 15 per cent did not mind (Phillips, 2000). In Wakeling's survey of postgraduates, the proportion of research students who had attended the same institution as undergraduates ranged from about 30 per cent to 46 per cent (source: authors' calculations).

It is known at undergraduate level that students who live at home differ in certain respects from those who move away for higher education. These differences are often related to background characteristics such as socio-economic class and ethnicity and may have implications for graduate outcomes (Holdsworth, 2006). There are certainly likely to be restrictions on those with family or other emotional and practical ties to particular areas if they are considering a research degree (see section 10.1 below).<sup>19</sup> Additionally, there may be a tendency for potential research students from certain backgrounds to remain with familiar surroundings rather than move to another institution and 'start again'. In some disciplines, particularly for an academic career, there appears to be an advantage to mobility at doctoral and post-doctoral levels (Crossouard, 2009; Munk, 2009). Anecdotally, we are

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<sup>18</sup> PhDs are called DPhils at the University of Oxford and a small number of other institutions.

<sup>19</sup> Kiley and Austin (2008) found that nearly all Australian research students remain in their first-degree institution. The geography of Australia doubtless strongly influences this – but we might expect that students in some areas of the UK will face similar constraints. The researchers also found that reluctance to move was the default position reported and argued that this might affect students' access to the most appropriate supervision and training.

aware that in departments in some universities, students considering doctoral study are routinely advised to move institution.

It is also known that most research students do not enter research degree study immediately after a first-degree. However next to nothing is known about the duration of time between completing a first degree and entering a research degree. A study in the USA showed that among 1992/93 first-degree graduates, the average time between graduation and entry to a doctoral programme was about two years, with almost one quarter of entrants having a gap of three years or longer between the two levels (Nevill *et al*, 2007). Wakeling's survey of postgraduates found a mean gap of about five years, but with a very broad range. Approximately one-third had progressed immediately and 80 per cent had entered their research degree within seven years of their first degree. However around five per cent had waited 25 years or more!<sup>20</sup>

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<sup>20</sup> Source: authors' calculations.

## 6 FINANCIAL FACTORS AFFECTING ACCESS TO POSTGRADUATE RESEARCH

### Summary

- The largest source of tuition funding for UK-domiciled research students is research council studentships, with other public and private bodies also providing funding. However a substantial minority of research students pay their own tuition fees. Little reliable information is available about maintenance support.
- Research council funding is concentrated in particular departments and institutions. Increasing concentration of research funding may have implications for widening participation to postgraduate research degrees. Further research is needed in this area.
- There is some evidence that women and students from lower socio-economic classes are less likely to receive research council studentships, but more evidence is required in this area.
- Research at undergraduate level suggests a link between debt or debt aversion and higher education participation (or at least the nature of that participation). Given the available research evidence, it is difficult to be certain whether the same can be said of entry to postgraduate research degrees, although there are indications that this might be the case.
- Evidence from the USA does not find a strong link between indebtedness and lack of participation at doctoral level.

### 6.1 Funding and fees for postgraduate research degrees

Funding arrangements for UK-domiciled students differ quite markedly between undergraduate and postgraduate levels. Tuition fees and maintenance support packages for undergraduates are heavily regulated and controlled by government policy. Students who secure a place on a full-time undergraduate course in a publicly-funded institution are entitled to certain levels of support, dependent on their financial circumstances and with the level of fee prescribed by the government.<sup>21</sup> To cover their living costs, undergraduate students can apply for loans via the Student Loans Company and may be eligible for a means-tested maintenance grant and/or further

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<sup>21</sup> The precise arrangements vary across the four home nations' jurisdictions.

bursaries made available on a variable basis by institutions. Again, slightly different arrangements apply between England, Scotland, Northern Ireland and Wales.

Postgraduate tuition fees are effectively unregulated, with the exception of a few special cases, such as teacher training courses or postgraduate nursing. Fees for masters degrees can range from roughly equivalent to undergraduate levels (around £3,000 per annum for a full-time student) to upwards of £20,000 for some business or computing qualifications (see Atwood, 2009). Tuition fees for postgraduate research degrees however tend to follow the levels set by the UK research councils as the maximum amount they will pay to an institution for a student awarded a research council studentship (in 2009/10, this amount was £3,390 per annum).<sup>22</sup> Postgraduates have no entitlement to funding support for tuition fees or maintenance from the state (again with the exception of teacher training, nursing and a few other areas).

The principal source of funding for postgraduate research students is research council studentships (except in Northern Ireland, where there are some RCUK awards, but DELNI provides most of the equivalent funding). For UK-domiciled students these awards cover tuition fees and maintenance payments for three to four years of full-time study at doctoral level, or in some circumstances for one year full-time research training masters degrees. Part-time equivalent awards are available. The maintenance award (stipend) at doctoral level for 2009/10 was a minimum of £13,290 (with additional payments available for students at institutions in London and in certain shortage subjects).<sup>23</sup> Research council studentships are allocated in different ways according to the individual research council concerned. Some are available on a competitive basis with applications from students being judged against each other; some are awarded via a variety of special initiatives, often in collaboration with other public, private and voluntary sector bodies; many awards are made direct to institutions, which are then free to select a student themselves and, in the case of the Biotechnology and Biological Sciences Research Council, Engineering and Physical Sciences Research Council, Natural Environment Research Council, Medical Research Council and the Science and Technology Facilities Council, to use a flexible doctoral training/grant account to fund studentships. Other sources of funding for research students include studentships provided by institutions either with or without an associated teaching or research obligation, industrial, charitable or other government body funding, usually for a specific project. With the

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<sup>22</sup> See: <http://www.rcuk.ac.uk/cmsweb/downloads/rcuk/researchcareers/letter0608.pdf>

<sup>23</sup> Research councils also provide additional funds for 'transferable skills' training and in some cases a research support fund for the student.

exception perhaps of studentships offered by the Wellcome Trust and the Prince of Wales Innovation Scholarship initiative, research council studentships usually prove to be the most financially attractive awards.

Data on the overall proportion of UK-domiciled research students who are funded by different sources is available in several places, but it is difficult to find comprehensive up-to-date figures. House (2010) reports 39 per cent of UK and EU research students were financed by 'private' and 34 per cent by 'public' sources, but does not provide further details. The balance has shifted from private to public sources since 2002/03 (Sastry, 2004a). Artess *et al* (2008) cover postgraduate student finance, but do not separate out research students. HEFCE (2009, pp. 39 - 44) reports that 20 per cent of full-time and 60 per cent of part-time UK-domiciled PhD starters in 2004/05 had no financial backing. They also show substantial differences between subjects in the proportion of full-time PhD starters without financial backing, varying from a low of 6 per cent in Physics and Chemistry to a high of 43 per cent in Law. Unsurprisingly, a much lower proportion of students in STEM disciplines have no financial backing, although in Medicine & Dentistry, this situation applies to about one-quarter of starters.

Most of the information available on postgraduate student finance covers payment of *tuition fee*. There is very little information available about how postgraduate students meet their living costs. Whilst we might assume that many part-time research students will be employed in full- or part-time work, full-time students may or may not be. Students with a research council award will receive a stipend. Some other students in receipt of public, private or institutional sponsorship for their tuition fees will also receive maintenance payments, but we cannot determine which ones from the available data. We were not able to find evidence about how research students support themselves financially. The exception is data collected for Wakeling's survey of postgraduates, where our analysis shows that over one-quarter of research students reported that they covered their own maintenance costs and nine per cent received such support from their family.

Quite apart from facilitating access to postgraduate study, HEFCE (2005a) has shown that students supported by the research councils are more likely to complete doctoral studies in a timely manner. Of course this may be related to ability, if students who obtain awards are already selected on the basis of their prior academic attainment, but it does still imply that careful consideration of the allocation of studentships on equity grounds should be undertaken.

## 6.2 Who receives funding for postgraduate research?

### 6.2.1 By subject discipline

BIS provides statistics on the source of funding for research students in science, engineering and technology (SET) subjects, but not for those in other areas. For 2007/08, these statistics show that 38 per cent of full-time UK-domiciled first year doctoral students had their tuition fees paid by the research councils, 19 per cent by universities and 17 per cent were self-financing. About 16 per cent of tuition funding came from other private sources (charities, industry etc), with the remainder made up of other public sources. Among research masters in SET subjects, more students were self-financing (29 per cent) than research council funded (27 per cent). Only one per cent of part-time research students in SET subjects were research-council financed, with 55 per cent of doctoral and 49 per cent of research masters students paying their own fees (source: BIS SET Statistics 2009, Table 5.7).

Table 1: Research Council new studentship awards 2006/07, by council<sup>24</sup>

<i>Research Council</i>	<i>No. new awards</i>	<i>Per cent</i>
Engineering and Physical Sciences Research Council (EPSRC)	1,951	39
Economic and Social Research Council (ESRC)	762	15
Arts and Humanities Research Council (AHRC)	673	14
Biotechnology and Biological Sciences Research Council (BBSRC)	605	12
Medical Research Council (MRC)	433	9
Natural Environment Research Council (NERC)	321	7
Particle Physics and Astronomy Research Council (PPARC)	207	4
<i>Total</i>	<i>4,952</i>	<i>100</i>

(Source: BIS SET Statistics 2009, Table 5.11)

<sup>24</sup> DELNI provides research training funding to the two Northern Irish universities via doctoral training accounts and does not provide statistics on students funded through these allocations.

In 2006/07 the research councils provided 4,952 new research studentships (plus a further 1,372 advanced course awards). The majority of research studentships were in the sciences (see Table 1). Although there was a slight decline in awards on 2005/06, the number of awards made rose by one-third in the decade from 1996/97 (source: calculated from BIS SET Statistics, 2009, Table 5.11). According to BIS there were 2,775 full-time first-year UK-domiciled research students in non-SET subjects in 2006/07. With 1,435 new research studentships awarded by the AHRC and ESRC, this would mean just over half of non-SET research students are funded by the research councils. However this is likely to be an overestimate, because it ignores EU students, who will obtain some of the research council studentships; and it assumes that all students funded by ESRC are in non-SET subjects. It would seem that new students in non-SET subjects are more likely to obtain research council funding, but this might simply be related to a lack of other sources of funding for non-SET subjects. The position for *part-time* study will be somewhat different – HEFCE (2009) reports that less than 100 part-time PhD starters in 2004/05 had their fees paid by the research councils.

### 6.2.2 *By institution*

BIS' SET Statistics do not indicate which institutions host research council studentship holders nor is it easily possible to determine whether institutional subsidy of research studentships is concentrated in particular institutions or mission groups. However RCUK will be aware of the institutions to which it allocates doctoral training accounts and quota studentships. Pre-1992 universities (and especially the Russell Group) are prominent here, although there are some awards tenable in new universities.

If there is a structuring of access to research degree study by institution, as suggested in sections 5.3.2 and 7, then this might be exacerbated by the concentration of funding in a small number of institutions. Just as we do not fully understand the nature of transfer or retention across institutions between first-degree and research degree level, so we do not know whether students from the same or other institutions are likely to be allocated research council studentships by schools and departments. Zimdars (2007) found that research council funding at Oxford seemed to be allocated on a meritocratic basis, but there is no other research on this issue of which we are aware. Earlier discussions with RCUK suggest that it would not be possible to investigate this on the basis of data held by the research councils centrally, except perhaps for the small amount of schemes where studentships are allocated by a council on a competitive basis (eg AHRC) rather than allocation decisions being devolved to institutions. At the time of writing, moves to concentrate further funding for research training in England are still the

subject of debate. However the move by many of the research councils to a Doctoral Training Centre model will certainly lead to more concentration. We do not seek to comment on the practical and intellectual justifications for this trend (ie whether it will deliver better quality research training). Instead we would simply point out that the implications of such concentration for widening participation to research degrees are little understood. The evidence presented in this review implies that there may be a negative impact in terms of diversity to a policy of concentration and there is thus an urgent need for a more thorough examination of the associated trends.

### 6.2.3 *By student characteristics*

BIS SET Statistics 2009 show that men in the sciences were more likely to be research council supported and less likely to be self-financing than women. At doctoral level, 45 per cent of full-time male students were research council funded, against 31 per cent of women; conversely 19 per cent of women and 16 per cent of men paid their own tuition fees. This *may* be related to subject differences in the distribution of women in the sciences, but it is not possible to tell from the available data. There is little data published on the distribution of awards between men and women in non-science subjects. AHRC data on competition outcomes are an exception. Statistics for 2006 - 2008 show only small differences in the award rate of male and female applicants, with a change from year to year in which gender was most successful. As for ethnicity, the very small number of applicants from BME backgrounds for doctoral awards means it is difficult to come to any judgement about applicants from particular groups; however there was no difference in success rate between BME and White applicants for 2008.<sup>25</sup> It should be noted also that 18 per cent of applicants did not declare their ethnic background.

We can be relatively certain that students holding research council awards are well-qualified, especially in certain subject areas where there is a high level of competition for awards (such as for AHRC studentships). This may mean that most award holders in some subjects have first-class honours degrees and/or a masters qualification too.

No data is published on the distribution of research student funding by ethnicity, socio-economic class, declared disability or other such characteristics. This is in principle available from HESA, except for data on socio-economic class, which is, as noted in section 7.1, not credible for postgraduates. Wakeling (2009a) found that research students from NS-SEC

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<sup>25</sup> See: <http://www.ahrc.ac.uk/FundedResearch/Pages/ResearchStatistics.aspx>

classes 1 - 3 in his survey were more likely to receive funding than those from classes 4 – 7.<sup>26</sup>

Clearly it is of concern if there is no understanding of the distribution of research council (and other) funding across different demographic groups. We suggest that research is needed in this area to establish whether certain groups are systematically disadvantaged in obtaining research council and other awards to support entry to a research degree. This research would need to take account of differences in the process by which awards are allocated by the respective councils.

### **6.3 How does funding affect the decision to enter postgraduate research?**

#### *6.3.1 Evidence from undergraduate education*

With the introduction of tuition fees for undergraduate study and of 'top-up' fees thereafter, plus the change from student grants to maintenance loans to a mixed package of support there has been much academic and political interest in the impact of student finance arrangements on students' decision-making processes. Fears that the introduction of tuition fees would affect participation by less privileged groups appear to have been unfounded, at least in the aggregate, as there is evidence of continued growth in participation over time for all socio-economic groups and some tentative suggestion that the disadvantaged are improving their participation relative to other groups (HEFCE, 2010). However these aggregate trends can of course hide both severe hardship for individuals and other changes to the pattern of undergraduate study.

Research shows that undergraduate debt levels have risen steadily (Callender and Wilkinson, 2007). Based on research among prospective students, some have argued that aversion to debt deters students from entering higher education in the first place and constrains the choice of subject and institution (Callender and Jackson, 2005, 2008; Davies *et al*, 2008; Hutchings, 2003). Unsurprisingly, students from less privileged homes are more prone to debt aversion. It is also clear that a substantial proportion of students work during term-time to help support themselves financially, that the amount of paid work undertaken varies by socio-economic background and that working during term-time tends to depress academic results (Brennan *et al*, 2005).

If correct, the implications of these findings for postgraduate research study would be that students who are averse to debt would also be averse to

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<sup>26</sup> See section 7 for further explanation of NS-SEC.

entering postgraduate study, at least without a studentship. If a student holds large amounts of undergraduate debt and is debt-averse, this may prompt them to enter the labour market at the earliest possible opportunity in order to clear what they owe. However there are several reasons to treat these claims sceptically. Firstly, it is not clear that the changes to student finance have materially affected the financial decision-making of those from less well-off families. Participation in higher education by these groups was lower before the introduction of tuition fees and replacement of maintenance grants with loans. Secondly, it is not clear whether expressed attitudes are an accurate guide to actual behaviour: in other words did those who expressed debt aversion actually not participate? Finally we *might* expect debt aversion to be less important at postgraduate level since the debt averse have already been selected out at undergraduate level.

### 6.3.2 UK evidence on research student funding and decision-making

Research by Stuart *et al* (2008) directly addresses the question of debt aversion and continuation to postgraduate study. They found that expressed aversion to debt, rather than the level of debt itself, was a strong negative influence on continuation to postgraduate study (of any kind). However as their research was conducted in post-1992 universities, where the progression rate to research degrees is in any case low, it is not certain that this finding applies readily to access to postgraduate research. Phillips (2000) also found aversion to debt and the level of maintenance support for doctoral study to be potential discouragements for entry to postgraduate study, although here there was no indication as to whether this affected actual behaviour. Wakeling (2009a) found about one-third of postgraduates in his survey had no student debt; roughly a third had up to £12,000 of debts; with the remaining third having over £12,000 of debt.<sup>27</sup> Postgraduates from lower socio-economic class backgrounds were less likely to have debt. However lacking data on those not entering postgraduate study as a comparator group, it is difficult to draw meaningful conclusions about these findings (which in any case do not separate out research students). Purcell *et al* (2005) found actual debt levels were associated with a lower likelihood of enrolling on a masters programme, controlling for other factors. However the results were only statistically significant for very small and very large debts and there was no indication as to whether this would apply to enrolment on a research degree programme. Research undertaken by the NPC with current postgraduate students gives some further evidence about the impact of financial considerations on

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<sup>27</sup> This analysis was limited to postgraduates who had obtained their first degree in 2000 or later. A weighted mean debt of £5,972 was calculated, which is in line with the debt levels found by Darwen *et al* (2002), allowing for inflation.

postgraduates' decision making and of the financial circumstances of research students (Darwen *et al*, 2002). Around half of students reported a higher income than expenditure. A quarter of research students had more expenditure than income. Over half of full-time postgraduates undertook paid employment, averaging around 15 hours per week. Both positive and negative impacts of doing so were reported. Most importantly, respondents were asked whether financial considerations had affected their choice of location and mode of study. Unfortunately the results are not broken down across the taught/research divide, but they do show that only 40 per cent of students report no influence of financial factors on location of study and 44 per cent on mode of study (full- or part-time). It is also pointed out (p. 27) that "students in post-1992 universities were more likely to say that financial considerations had an influence on their choices."

Another NPC report, again based on a non-probability sample, but this time including both undergraduates and postgraduates, looked at future intention to enter postgraduate study (NPC, 2006). This survey found some socio-economic class differences in consideration of financial matters, with those from less privileged groups being most negatively influenced. Cost was cited as a major deterrent by respondents. However there are design weaknesses in the study which make it difficult to determine how accurate these findings are and in any case research students are again not treated separately.

Information about liability for tuition fees as an undergraduate might be used as a useful proxy for a student's access to financial resources. Under the tuition fee regime introduced in 1997 at undergraduate level, liability for fees was means-tested, with students being eligible for full, partial or no remission. Heath and Zimdars (2003) found that postgraduates at Oxford had been more likely to be liable for all or part of the tuition fee as undergraduates than the national average. However this is likely the case at undergraduate level at Oxford too. Wakeling (2009a) found postgraduates who graduated after 2002 were more likely have been liable for fees as undergraduates than English undergraduates in 2005/06. However he was unable to determine whether this was related to their ability to enter postgraduate study or simply a reflection of some other dimension of the postgraduate population.

Methodologically, the soundest research design for studying the effect of finance on progression to postgraduate study would be that adopted by Purcell *et al* (2005) and Stuart *et al* (2008). To understand whether indebtedness and financial resources are influential, we need to see if there are differences on these measures between participants and non-participants; that expressed attitudes match actual behaviour; *and* that other factors are taken into account (such as whether students who are debt averse are

academically qualified to enter research study). Studies which simply survey current postgraduates or ask potential students their views cannot provide a holistic understanding in this area.

Finally, there has been a long-running concern in research policy about the impact of research student stipend levels on recruitment, driven in the main by fears of personnel shortages in key subject areas and an impression of a lower quality intake to doctoral-level programmes. These concerns are discussed in the OST survey of postgraduate study intentions (Phillips, 2000) and were tackled in detail by the Roberts Review (2002), which resulted in a substantial enhancement to research council stipends so that they approached the level of average graduate starting salaries in real terms. Although this discussion has generally been carried out without reference to the widening participation debate, the impact of the changes on take-up of research council studentships may hint at the broader effects of finance on postgraduate decision-making, which is relevant for widening participation. An evaluation of the Roberts Review enhancements concluded that they had indeed had the impact intended and recommended further enhancements in areas where there are continued recruitment difficulties (Ackers *et al*, 2006). The changes certainly coincided with an improvement to recruitment and retention of UK and EU research students in Economics (Wakeling, 2008).

### 6.3.3 *International evidence on doctoral funding*

Although there are many differences between higher education in the UK and USA, there is a long experience of student loans, debt and high tuition fees there. American studies have directly investigated the impact of undergraduate loans and debt on access to graduate study. Results are a little ambiguous however. Millett (2003) found substantial student debts delayed entry to graduate school, but among those who actually applied, debt had no effect on acceptance or enrolment. Kim and Eyermann (2006) found that borrowing had a *positive* effect on enrolment in graduate school, although this appears to have changed from a negative effect after the removal of certain borrowing limits on federal student loans. Hill (2008) found complex relationships between debt, other factors and graduate school enrolment, although in general it seemed that taking a loan is not significantly predictive of graduate enrolment. Kim and Otts (2010) found doctoral students with large debts completed their studies more quickly than those with small or no debts (presumably to avoid accumulating more debt!).

## 7 SOCIO-ECONOMIC CLASS AND ACCESS TO POSTGRADUATE RESEARCH

### Summary

- Several different ways of measuring socio-economic class have been used in previous studies of widening participation and most of these are seen also in the literature on access to research degrees.
- There are inequalities in progression to research degrees by socio-economic class. However there is a growing consensus that these differences are accounted for by other factors rather than being a direct result of socio-economic class.
- Much less is known about the socio-economic class background of current research students. There are some indications of more severe socio-economic inequalities in later transitions and a clear need for further research in this area.
- International evidence is also rather patchy, but tends to support the view that doctoral-level study is more exclusive than earlier levels.
- The impact on the research workforce is unclear, but there are some indications that, in academic research at least, staff are more likely to be from socio-economically advantaged backgrounds.

### 7.1 Measuring socio-economic class

'Class' can be a slippery concept, with many different meanings for different researchers and differences between popular and social scientific definitions. In research on widening participation, socio-economic class has been defined in different ways. The most common is to classify individuals according to the occupation of the highest earner in their household, typically using an official government scheme. The current scheme used by the government is the National Statistics Socio-Economic Classification or NS-SEC. This puts occupations into seven main groups (with an eighth for the long-term unemployed or those who have never worked or are otherwise difficult to classify). The NS-SEC of home applicants to higher education via UCAS is recorded and forms the basis of a number of 'performance indicators' published by HESA on widening participation at undergraduate level. NS-SEC has been shown to be correlated with a range of educational and health outcomes and inequalities. However it does not always capture other

dimensions of privilege/disadvantage such as income, property, wealth or cultural 'assets'. The measure of 'socio-economic status' or SES used in the US does capture income.

An alternative approach is to classify individuals according to the socio-demographic characteristics of their 'micro-neighbourhood', using postcodes to identify residence and a range of Census and survey data to determine the characteristics of neighbourhoods. Some social scientists have argued that this is a better measure than occupational classifications because it also captures some indication of property ownership, access to educational opportunities (eg 'good' schools) and so on (eg. Burrows and Gane, 2006; Webber, 2009). The measure has been used by HEFCE in a large-scale study of young participation in higher education, where large differences in participation across neighbourhood types were noted (HEFCE, 2005b, 2010). However micro-neighbourhoods are not uniform and could contain those from different occupational classes. At the individual level then, such measures can be quite 'blunt'.

Other measures used include the level of education obtained by a students' parents (especially whether or not they attended university); the type of school a student attended (independent or state); and sometimes whether the student was eligible for free school meals at school. All of these measures have problems and really only give a one-dimensional picture of the socio-economic position of an individual. One could attend state school and be the child of non-graduate parents, but still be very privileged, for instance.

In addition to these conceptual difficulties, there are also practical problems of missing data, difficulty obtaining data and the meaning of data collected about postgraduates which beset measurement. Concerns have been expressed about the quality of NS-SEC data provided by UCAS. Missing data is a particular and growing problem and research has suggested that those reported as social class 'unknown' are far from being a random set within the broader population of applicants to higher education (Harrison and Hatt, 2009). When it comes to the use of postcode data for postgraduates there are even greater difficulties. Both Wakeling (2009a, p. 115) and House (2010, p. 21) point out the problems with using postcodes:

the status of [postgraduates'] address is ambiguous. Some...are 'settled' older students; some are transient, residing near their institution prior to moving on to employment; others might give a parental address.

HESA...collect postcode data to identify students from deprived areas, but again by postgraduate level this information is fairly useless as students may well have moved away from their family home

Information about parental education is not yet available for any postgraduates, having been collected via UCAS for undergraduates only since 2008/09.

## 7.2 Socio-economic class and *immediate progression to postgraduate study*

As will become clear, the overall area of access to postgraduate research degrees and socio-economic class has been substantially under-researched. However there is now a weight of evidence on one specific aspect of entry to higher degrees by research which does allow a judgement to be made with an element of confidence.

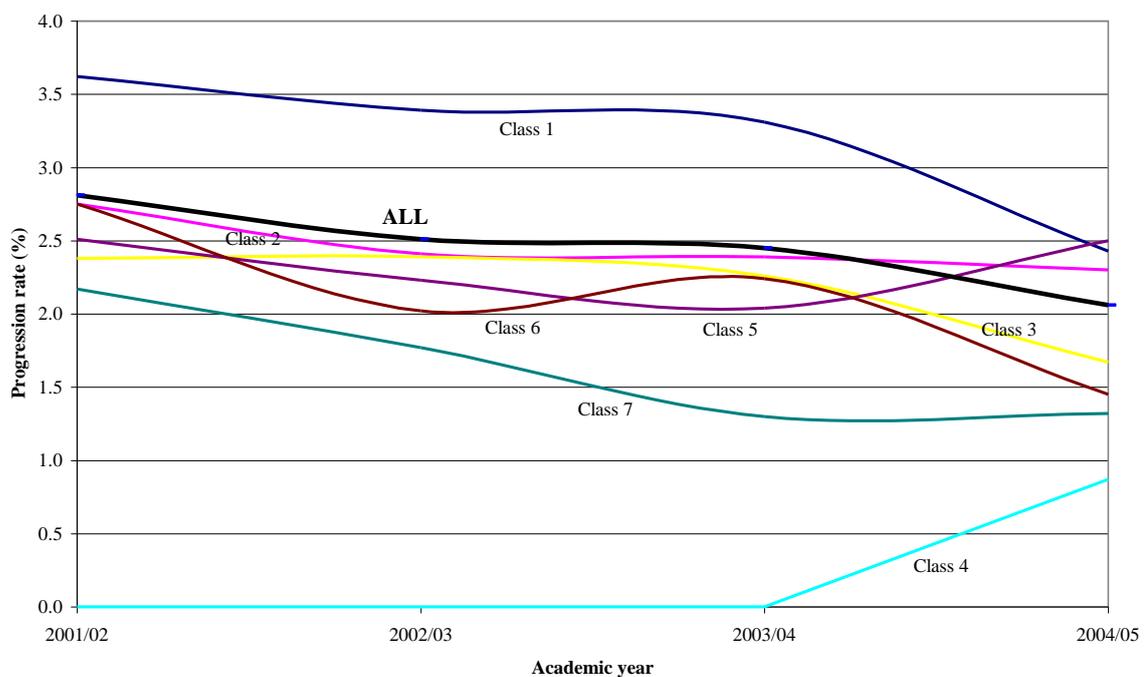
Five separate studies, using slightly different datasets and approaches, have all shown that there appears to be very little direct impact of social class on *immediate* progression to postgraduate study, including higher degrees by research. This finding is somewhat surprising, given what is known about socio-economic class and educational progression in general, both in Britain and throughout the world. It is, as will be made clear, also only a partial picture of access to research degrees.

HEFCE's (2005b) study of participation in higher education by micro-neighbourhood included an investigation of whether undergraduates progressed to a higher degree by research as their first destination. Graduates were classified into five 'quintiles', representing the level of deprivation of their micro-neighbourhood classification area. This found that there was a variation between the quintiles, but that it was substantively quite small *and* in favour of the disadvantaged: the range was a 2.8 per cent progression rate for the most deprived quintile, to 2.3 per cent for the least deprived. Purcell *et al*'s (2005) study of 1999 graduates found no relationship between occupational social class and progression to a masters degree (either immediately or slightly later on), although they did not cover research degrees. Stuart *et al* (2008) found no relationship between occupational social class and plans for postgraduate study. Machin and Murphy (2010), studying data on 2008 graduates who responded to the DLHE survey, showed that there was very little difference in the NS-SEC classification of those graduates progressing to further study or not; this held true when controlling for degree subject and institution and ethnicity. They did find that independently-schooled pupils were more likely to progress to further study on graduation, but the difference was very small (about 1.2 per cent). Power *et al* (2003), in their sample of 'high achieving pupils', found a slightly higher rate of entry to postgraduate study among independently-schooled girls.

Wakeling (2009a) also looked at the relationship between socio-economic class and immediate progression to postgraduate study. However he separately identified those progressing to a higher degree by research. He ran a series of statistical models designed to control for a range of academic and background characteristics, such as degree classification obtained, first-degree institution, age, gender and subject discipline. This showed that there was a direct effect of socio-economic background on progression to a higher degree by research. However the magnitude of its direct effect was really quite small. As with the HEFCE study, this showed very slightly better odds of progressing to a higher degree by research for those from less privileged backgrounds. This is interesting, in that in earlier educational transitions there is usually some socio-economic class influence in the other direction. It should be noted however that some of the differences were not statistically significant.

This is not to say that there were not inequalities in progression to a higher degree by research by socio-economic class. There were consistent differences across time (see Figure 1). However those differences were largely attributable to other factors, such as degree classification obtained, subject studied and institution attended. Wakeling argued that the last of these factors was the most important to consider, since it appeared that students from less privileged backgrounds were able to progress to higher degrees by research provided they attended the 'right' kind of institution.

Figure 1: Rate of progression of first-degree graduates to research degree study, 2001/02 – 2004/05



(Source: Wakeling, 2009a, p. 157)

### 7.3 Socio-economic background of enrolled postgraduate students

As has been made clear, most research students do not progress immediately from a first degree to a higher degree by research. It is possible therefore that different patterns of entry by socio-economic class apply at different points. The Robbins Report (Committee on Higher Education, 1963) found that students with parents in manual occupations had a proportionally higher representation at postgraduate than at first-degree level. This finding was replicated by Rudd (1975), who suggested it was due to the shift in the balance of subject disciplines at postgraduate level. As science subjects increase their representation, so the proportion of students from manual occupational backgrounds would increase as such students were more likely to be studying science. Heath and Zimdars (2003) study of first-year postgraduates at Oxford however found that their social class background was higher than that of comparable undergraduates, but did not separate taught and research students. Zimdars (2007) also reports that students entering Oxford from less prestigious institutions were, on average, of a higher social class background than the overall profile for their first-degree institution.

HESA now collects data about the socio-economic class of postgraduate students. However this data is optional; most institutions elect not to provide it and so coverage is patchy indeed. The validity of the data can also be called into question. It is worth quoting House (2010, p. 20) at length here:

HESA have been collecting data on socio-economic class (SEC) from students at postgraduate level since 2002/3. However, before examining these data, there are some considerations that should be taken into account. Firstly, those of known SEC total only around ten per cent of the cohort. Secondly, SEC is recorded as that of the parent if the student is under 21 but refers to the previous occupation of the student if he or she is over 21. Considering the vast majority of postgraduates are over 21, it is safe to assume these figures give the student's own background rather than that of their family. Those who have been in work before undertaking a postgraduate qualification may well have already improved their situation as a result of their undergraduate qualification, so a significant proportion of those from a lower SEC family background will be hidden. This means these data will be skewed to suggest that more postgraduates come from a higher SEC than might be the case if we were able to examine that of their families. Furthermore, those whose previous occupation was 'student' and over 21 will have been listed as 'not classified' in HESA's data,

which eliminates any student who has come straight from undergraduate to postgraduate study unless they are under 21.

House goes on to analyse the resulting data for 2007/08, which shows a strong overrepresentation of those from NS-SEC groups 1 and 2 on research masters (but curiously does not report doctoral students). However given the concerns she outlines, we give no credence to this data. We agree with House that there is scope to use data about NS-SEC collected during undergraduate application by linking undergraduate and postgraduate records. HEFCE has successfully done this through 'fuzzy matching' of undergraduate and postgraduate student records in the past. If HESA were better able to match records in this way (perhaps using the 'unique student identifier' as suggested by House), much more detailed and satisfactory analyses could be undertaken of socio-economic class background (as well as other facets of entry to postgraduate study, such as academic details of the first degree).

Wakeling's (2009a) survey of postgraduate research students represents perhaps the only data available in the UK about the socio-economic class background of current postgraduate research students. This shows a substantial shift towards NS-SEC class 1 in particular at research degree level. For instance, 26 per cent of first-degree graduates progressing to a higher degree by research in 2004/05 were from NS-SEC class 1, compared to 45 per cent among respondents to the postgraduate survey. This shift to exclusivity occurred in each of the eight participating institutions at research degree level, regardless of institution type. It must be noted that the response rate to the survey was low and that it could not be treated as nationally representative. However the postgraduates could be classified on their parents' occupations, not their own (this data was also collected), which avoids some of the difficulties raised by House above. The result does at least suggest there is a strong case for more detailed research on the socio-economic class background of those entering research degree study after a break from first-degree study. One potential explanation for the disparity might relate to financial resources. These were covered in section 6 above.

Wakeling's survey also provided data about parent's education. It is well known that parental education influences children's likelihood of entering higher education, both in the UK and elsewhere (Thomas and Quinn, 2007). It was clear from the survey results that research students were more likely to have parents who had higher education qualifications than taught postgraduates and that there was a substantial overrepresentation of the children of the highly qualified among research students. Stuart *et al* (2008) also found that the so-called 'first generation' undergraduates in their study were less likely to seek postgraduate qualifications. Heath and Zimdars (2003)

however found little evidence of postgraduates' parents being more highly qualified than undergraduates'.

It is clear there is scope for much improvement in data about the socio-economic background of all postgraduates, including research students. The recommendation in the Postgraduate Review commissioned by BIS that

The UK Government should establish a working group with the Higher Education Statistics Agency, higher education funding bodies, Universities UK and other stakeholders, to advise on what additional information should be collected about postgraduates to inform future policy decisions on widening access to postgraduate study.

(BIS, 2010, p. 81)

is therefore welcomed.

#### **7.4 International evidence**

We have shown that there is only a limited amount of research in this area in the UK. There is *some* international evidence; in contrast to research about earlier educational inequalities though it is difficult to detect an emerging consensus. Again, research specifically about access to research degrees and socio-economic class is quite rare, there being more studies of access to postgraduate education more generally. Mastekaasa (2006) shows class impacting on the transition from masters to doctoral study in Norway, although he found that parental education level, rather than occupational class, was a better predictor. In Finland, PhD holders were found to be less likely to be from working-class backgrounds (Silvennoinen and Laiho, 1994); Bornmann and Enders (2004) found similar results for Germany. In the US, Mullen *et al* (2003) reported an effect of socio-economic status and parental education on enrolment on doctoral degrees. Zweigenhaft (1993) found that Harvard graduates who had attended state schools were more likely to enter doctoral study than their peers who had attended private schools. Zhang (2005) found that controlling for institutional quality and choice of subject, parental income and parental education were positive predictors of enrolment in doctoral degrees; however the effect was quite small. Nevill *et al* (2007) showed doctoral students were most likely to have a parent with an advanced degree themselves. Walpole (2008) found stark contrasts in PhD enrolment rates by socio-economic status in the field of Education among African-Americans. In Australia, James *et al* (2008) showed students on higher degrees by research were the most likely of all students to be from high socio-economic status homes. In France, the proportion of working-class students declines at doctoral level, although it remains higher than among the *grandes*

*écoles* (Albouy and Wanecq, 2003; Euriat and Thélot, 1995; MEN and MESR, 2008; Merle, 1996).

The apparent trend here is that research degree students tend to be from higher socio-economic class backgrounds than first-degree students. That would seem, at least partially, to support Wakeling's (2009a) finding for the UK. However it must be remembered that the international evidence largely does not control for academic factors which might structure progression to research degrees. The direct effect of socio-economic class on entry to postgraduate study remains to be investigated in more detail.

## **7.5 Impact on the research workforce**

Just as there is limited data on the socio-economic class background of postgraduate students, so not a great deal is known about the background of those making up the research workforce. Halsey (1992) found an over-representation of those from non-manual backgrounds in his survey of British academic staff, although the data is now quite old. A more recent study for the Sutton Trust (2009) found that independent schooling and Oxbridge attendance were over-represented among leading scientists and scholars, but did not examine occupational background in detail. In a smaller study, Choobbasti (2007) did look at the socio-economic class of Royal Society Fellows, finding most of them were from the higher social classes. Finally, a survey of stress levels in higher education conducted by the University and College Union with its members asked in passing about socio-economic background and reported over half from professional/managerial backgrounds (Court and Kinman, 2009). However the survey cannot be said to be representative.

There is certainly small-scale qualitative research evidence on the impact of socio-economic class background on the process of doctoral study itself, albeit largely situated within social science disciplines. This suggests that students from lower socio-economic backgrounds can find the experience emotionally and psychologically troubling as they enter into what can be a culturally alien – and reportedly at times hostile – environment. These difficulties are most frequently reported by women and suggest that gender and socio-economic background may combine to create a doubly difficult situation (see Wakeling, 2010 for a summary).

We cannot state definitively that the research workforce is unrepresentative of the socio-economic backgrounds of those with a good degree. However we suspect, on the balance of the evidence reviewed, that there are differences which would bear further investigation.

**Summary**

- Black and Minority Ethnic (BME) students are well represented at undergraduate level, but this is not carried through to postgraduate research study. Little is known about how postgraduate decision-making varies by ethnicity.
- There is very little research on the effect of ethnicity on progression to postgraduate study. Subject and institutional factors appeared to be important in leading to a lower progression rate to research degrees for most BME groups than seen in the white group.
- Although there has been an increase in the proportion of research students from BME groups over time, most remain underrepresented in comparison to first degree level.
- Further research is required into the situation in different subject disciplines and into how and why BME students decide for or against applying for research degree study and their experience once enrolled.
- On the face of it, there appear to be implications for the ethnic diversity of the research workforce of the underrepresentation of various BME groups in postgraduate research.

**8.1 Undergraduate participation and ethnicity**

It is well established that students from BME backgrounds have higher participation rates at undergraduate level than the majority White British group (Broecke and Hamed, 2008; Connor *et al*, 2004; Shiner and Modood, 2002). There are large differences between different BME groups however, with some, such as the Indian and Chinese groups, having very high participation rates; and others, including Pakistani, Bangladeshi and Black Caribbean groups having somewhat lower rates (albeit higher than for the White British group). Students from different ethnic groups are not identically distributed across higher education institutions and subject disciplines with some groups notably underrepresented in the most prestigious universities (Connor *et al*, 2004; Curtis, 2006; Shiner and Modood, 2002). We have already shown that BME students achieve lower degree results than White British students, on average, only around half of which can be attributed to other factors such as entry qualifications and subject choice.

As with socio-economic class data, some data on ethnicity are missing. Ethnicity is self-reported (as in the UK's Census of Population) and students are entitled to refuse to declare their ethnicity. Again, it is highly unlikely that ethnicity data is missing at random. There is also a suggestion that some institutions return more complete ethnicity data than others (Wakeling, 2005b).

Some research suggests that BME students' decision-making on initial entry to higher education is affected by the ethnic composition of potential institutions (Reay *et al*, 2005; Smith, 2007). One might add that white students may also be affected by the same factor, even if this goes largely unacknowledged. It is not known whether these considerations affect BME students' consideration of research degree study.

## **8.2 Ethnicity and *immediate progression to postgraduate research***

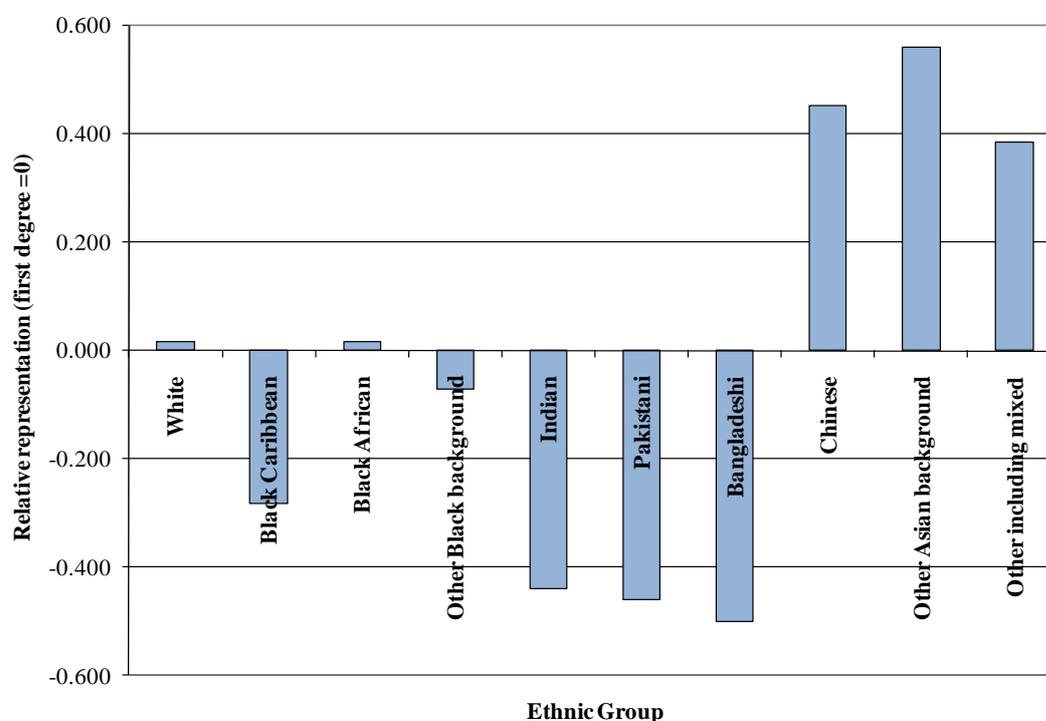
Connor *et al* (2004) analysed the first destination of graduates by ethnicity and found that whilst BME students were more likely to proceed to a taught higher degree than white students, they were less likely to proceed to a higher degree by research. Wakeling (2005b) investigated Connor *et al*'s finding in more detail. He began by noting that there did not seem to be any other research on the topic. This situation can be contrasted with research on socio-economic class and access to research degrees: although there is only slightly more research on the socio-economic class of postgraduates, there is a growing recognition that this area requires further research (see some of the quotes in section 2.2, for instance). Even this recognition seems to be absent at present with regard to ethnicity.

Wakeling tested whether the apparent underrepresentation of BME graduates among those progressing to higher degrees by research could be accounted for by other factors. He found ethnic differences remained in a statistical model which included subject of study, first degree institution and degree classification, but were only statistically significant for two groups. Students of Indian ethnicity were significantly less likely to progress to a higher degree by research than White British students; and Chinese students significantly more likely to do so. As with socio-economic class, there are not yet grounds to believe that equality on grounds of ethnicity has been achieved in progression to research degrees. This is because BME students – and certain groups in particular – may be disadvantaged both by attaining a lower classification of degree (see the discussion in section 5.1.2 above) and by attending particular kinds of institution, especially post-1992 universities, where progression to a research degree is relatively uncommon.

### 8.3 Ethnic background of enrolled research students

Turning to students enrolled on a higher degree by research (as opposed to those progressing immediately to one), a somewhat complex situation emerges. There is evidence of a sustained increase in the proportion of research students from BME backgrounds across time (House, 2010).<sup>28</sup> Thus in 2000/01, 11 per cent of UK-domiciled research students were from a BME background; this figure increased each year through to 2007/08, when it had reached 15 per cent. However as Wakeling (2009b) shows, this increase appears to track similar increases in BME representation at first degree level (and in the general population of young people).

Figure 2 Representation of UK-domiciled ethnic groups enrolled on research degrees (relative to first degrees), 2004–5 (where ethnicity known).



(Source: adapted from Wakeling, 2009b, p. 96)

A more detailed look at representation of different ethnicities on research degrees shows that, compared to first degree level, some groups are overrepresented and some underrepresented. Figure 2 shows this graphically. We can see that the Chinese and 'Other' ethnic groups see their representation rise substantially at research degree level, whereas all three of the other Asian groups see their representation decline quite dramatically, as does the Black Caribbean group. Wakeling (2009b) found some suggestion that the shift in

<sup>28</sup> Note that consideration of the ethnic background of postgraduates is absent from HEPI's earlier work in this area (Sastry, 2004a).

representation was related to subject of study: certain BME groups are disproportionately in subjects where research degree numbers are smaller, for instance. However this is by no means a definitive explanation.

A key problem here, apart from the overall absence of research into this issue, is the nature of the research undertaken. This is largely descriptive, detailing patterns of participation by ethnicity, but not identifying whether there are perceived barriers or aversion to research degrees among different ethnic groups (including whites). In the next section we consider what smaller-scale evidence there is on this issue in relation to individual subject areas or students.

#### **8.4 Evidence on research degree participation for individual subjects and individual students**

There are few disciplinary-level studies of BME students' participation in postgraduate research. Two major exceptions are studies conducted on the representation of BME staff and students in science subjects, conducted on behalf of the Royal Society, and the Royal Society of Chemistry and Institute of Physics (Jones and Elias, 2005; Elias *et al*, 2006). The Royal Society report, which covers BME representation in SET subjects from school through to careers, simply notes that there are fewer Black Caribbean, Bangladeshi and Pakistani doctoral students than would be expected based on population data (Jones and Elias, 2005). Elias *et al* (2006, p. v) provided a more detailed analysis however, stating:

Among students who achieve high standards at undergraduate level, ethnic-minority students are less inclined to study chemistry or physics at PhD level than their white counterparts. In contrast with this, ethnic-minority graduates in chemistry and physics are significantly more likely to go on to further study than their white counterparts. From this it can be inferred that ethnic-minority students tend to study subjects outside chemistry and physics at postgraduate level. This apparent drift away from chemistry and physics by ethnic-minority students presents an interesting avenue for future research.

Elias *et al* use the concept of the 'educational pipeline' to trace attrition from chemistry and physics education of students from different ethnicity. 'Survival' rates differ between physics and chemistry, but overall the white group has either highest or second highest survival rate between first degree and research degree. Black Caribbean and Bangladeshi students had the lowest survival rates in both subjects.

Wakeling and Johnson (2006) investigated patterns of progression for different ethnic groups in the subjects of sociology, anthropology and politics. These were complex, with overall BME representation being similar to that at first degree level, but the position of particular ethnic groups shifting somewhat. There were also marked differences across the subjects. The implications of these trends were potentially troubling (see section 8.6 below).

A number of BME researchers have written about their experience of doctoral study and different forms of discrimination they have encountered in what may be experienced as an unfamiliar or unwelcoming culture (as hinted at by Phillips and Pugh (2005), in the title of a chapter of their popular PhD self-help text: "How to survive in a predominantly British, white, male, full-time heterosexual academic environment"). Thus both Mahtani (2004) and Wright *et al* (2007) discuss the difficulties encountered in negotiating an academic career for BME women (as with socio-economic class, there is an overlap with gender inequalities here). These and similar studies have generally focussed on academic staff rather than PhD students *per se*, although some have covered both (eg Cole and Gunter, 2010). They have also been quite small scale, but that is part of the point: it is difficult to draw a large sample of an underrepresented minority.

## **8.5 International evidence**

Although not vast, there is some international literature on entry to research degrees by ethnic minority students. Much of this is American. Some of this research may give general indications of areas for further investigation in relation to access to research degrees in the UK, although it should be borne in mind that the US situation is very different in many respects.

Perna (2004) found that white students were the most likely to enrol in doctoral programmes, but that black men were more likely to enrol than white women and Hispanic men were more likely to enrol than white men. However a large-scale study of 1992/93 graduates found black and Hispanic students had higher rates of enrolment on doctoral programmes than whites or Asians (Nevill *et al*, 2007).

As with the UK, there are a number of accounts which describe the lived experience of doctoral study for students and professors from BME backgrounds: see for instance Johnson-Bailey (2004); Johnson-Bailey and Cervero (2008); and Gay (2004).

## 8.6 Impact on the research workforce

Taking up Elias *et al*'s 'pipeline' analogy, we can be reasonably certain that underrepresentation at doctoral level will translate into underrepresentation in the research workforce. However matters are generally complicated by migrant workers, who may subsequently settle in the UK. Thus we might find an ethnically diverse research workforce, but nevertheless find that BME graduates from the UK originally are underrepresented. Fenton *et al* (2000) for instance showed that 97.2 per cent of academic staff of British nationality were from the white ethnic group in 1996, although overall only 94.5 per cent of academic staff (of any nationality) were white. Analysis of the ethnic background of staff by HEFCE (2006) suggested there is an improvement in the representation of BME groups over time; however by 2007/08, the proportion of white staff who were British nationals had decreased only to 93.6 per cent (ECU, 2009a).

Data provided by Jones and Elias (2005) suggest that 93.9 per cent of the SET workforce is of white ethnicity, but there is no indication of the level of job this refers to (given that 1.3 million employees are listed, they are unlikely all to have doctorates!). Among academic staff in the same sector, they show a large overrepresentation of those of Chinese ethnicity, with all other ethnic groups underrepresented, except for white and 'other'.

In the social sciences, in addition to concerns about underrepresentation of certain groups in the workforce, there are also concerns about what this might mean for the nature of teaching and research in particular subjects. If this is limited to certain perspectives because of the characteristics of the people who have entered doctoral study and obtained academic employment, then the vitality of the disciplines will be diminished (see Wakeling, 2007, for a discussion). Moreover if certain ethnic groups are underrepresented, this may create a vicious circle through a lack of suitable role models:

Most faculty are male, white and without a disability, which yields a plethora of role models for candidates with similar characteristics, but obviously not for candidates who are from minority ethnic and racial groups and/or female and/or who have a disability. Clearly, such candidates may be less likely to imagine themselves as [researchers] than if they had a role model to follow.

(Taylor and Beasley, 2005, p. 144)

## 9 GENDER AND ACCESS TO POSTGRADUATE RESEARCH

### Summary

- There is a relatively extensive literature about women's participation in postgraduate research study. However this does not always focus specifically on factors affecting access to these qualifications.
- 'Horizontal' differences in enrolment between men and women persist, even though 'vertical' differences are eroding (or even inverting). Unlike at earlier educational levels, men are in the majority at doctoral level. This may in turn be related to subject differences in the popularity of postgraduate research degrees.
- Most attention is paid to the position of women in science, which may obscure more general issues of access to postgraduate research in all subject disciplines according to gender.
- Evidence shows that women are less likely than men to progress to a higher degree by research holding other factors constant. Further research is required to ascertain whether this applies to later entry to doctoral study. Furthermore, the differences are striking and easily researchable given the availability of data on students' gender, which makes the relative absence of research on this measure more puzzling.
- The literature indicates that women's experience of postgraduate research differs from men's. This may give some clues as to factors dissuading women from doctoral study.

### 9.1 Gender inequalities in (higher) education

A central theme of this review is the paucity of research on access to postgraduate research degrees. This does not apply to the question of gender and entry to research degree study however. In this area there is a considerable body of research, although as we shall see, it does not always allow us to answer the kind of questions posed here. There is a large and high-quality international research literature on the distribution of men and women across disciplines; on women's (*sic*) access to SET subjects; and on the experience of doctoral study and academia, particularly sexism and discrimination in the workplace. Perhaps surprisingly there is less research which looks at the direct impact of gender on progression to postgraduate research degrees across all subjects, although even here there is more and

higher quality evidence than in relation to other dimensions of inequality. Put bluntly, women are less likely to participate in postgraduate research than men, once we hold first-degree subject discipline constant

The apparent influence of gender at postgraduate research level is unusual, in that patterns are largely contrary to those seen at earlier levels of the education system, including access to undergraduate study. It has been clear for some time that, judged solely in terms of participation and attainment, girls have outperformed boys in school education and in entry to higher education. This is certainly the case in the UK and holds true internationally in the rich industrialised nations, with only a few exceptions (Buchmann *et al*, 2008; Vincent-Lancrin, 2008). From a situation where there was concern about women's access to tertiary studies, commentators now increasingly invert their attention and are concerned with the underrepresentation of men (Broecke and Hamed, 2008; Evers *et al*, 2006; HEPI, 2009). Other researchers have pointed out, with conviction, that these trends hide as much as they reveal and that higher participation by women than men does not mean that higher education has become 'feminised' or that women are now 'in control' (Carrington and Pratt, 2003; Leathwood and Read, 2009). Nevertheless, in 2006/07 women comprised 54.4 per cent of first-degree students and 53.1 per cent of taught higher degree students; however they represented only 46.7 per cent of students on higher degrees by research (full-time and UK-domiciled in all cases; source: HESA 2008, tables 1a and 1c). Interestingly this is precisely the OECD average for this measure (Vincent-Lancrin, 2008, p. 270).

## **9.2 Men, women, subject discipline and access to postgraduate research**

### *9.2.1 Sex 'segregation'*

Sections 3.2 and 5.2 explained differences in access and progression to postgraduate study by subject of study. Men and women are very differently distributed across fields of study both in the UK and internationally. In the research literature this is portrayed as effectively segregation by sex. Whilst women have increased their representation in successive levels of education ('vertically'), the balance of men and women in different subjects has not shifted markedly ('horizontally'). It remains the case that women are predominantly found in people-focused and 'caring' disciplines within higher education: social sciences, arts and humanities, education, law (and increasingly, medicine). Men on the other are predominantly found in the SET subjects. Even within fields this segregation applies: in social sciences there are more women in sociology and psychology; more men in economics and political science (Bradley, 2000; Charles and Bradley, 2002, 2009; Gerber and Cheung, 2008). Similar trends are apparent in natural sciences. This apparent

segregation reflects stereotypical views about the 'natural' differences between men and women (although of course those arguments were also made in the past, when the gender balance of fields was very different). England *et al* (2007) argue that there is a 'tipping point' in the growth of women's representation among doctoral students in a field after which men are subsequently deterred from entering. However they did not detect any change to the overall ordering of fields by gender balance.

It is worth noting that there is some correlation between disciplines where men are in the majority at doctoral level and the disciplines in which doctoral funding awards are most readily available.

### 9.2.2 *The 'women in science' literature*

A substantial part of the research literature on gender and doctoral study is concerned with the position of women in science (or more broadly SET subjects). This has tended to dominate discussion in research policy, with some good reason as women are certainly underrepresented in these disciplines. However it is worth remarking that women appear to be underrepresented at doctoral level in almost all broad subject areas, including those which are female-dominated, if the comparison is with the proportion of men and women at first-degree level. Remarkably Engineering and Technology is the only exception (Gutiérrez Esteban and Wakeling, 2005).

Much of the literature on women and science uses the metaphor of the 'pipeline'. This metaphor has two aspects: one is that to increase the number of women in scientific careers (at the end of the pipeline) there has to be an increase in flow (ie volume of women in science at each educational stage). The other is that there are 'leaks' in the pipeline - that is many women are 'lost' to science at some point in the educational career. Thus it is argued that there is attrition between first degree and doctoral levels, with a lower proportion of women 'flowing through' to doctorates than would be expected given representation at first degree level, a process which carries on through the academic hierarchy to professorial level (European Commission, 2003). Clearly there are implications of the underrepresentation of women at doctoral level on the representation in the research workforce.

Research into this area, as it relates to access to doctoral study, suggests that simplistic explanations of women's underrepresentation do not stand up under scrutiny. The pipeline analogy is increasingly rejected in favour of a 'lifecourse' perspective. A large number of factors are at play, relating to educational credentials, gendered roles and responsibilities (see section 10.1), lack of female role models and institutional sexism in SET workplaces and

cultures (Blickenstaff, 2005; Kulis *et al*, 2002; Xie and Shuman, 2003). Looking at the US case, there was growth in the proportion of bachelors and doctoral degrees in SET awarded to women almost every year from 1966 to 1996, but by 1996, women made up the same proportion of doctoral degree recipients as male bachelors recipients in 1977 (Xie and Shauman, 2003).

### **9.3 Quantifying the unexplained gender gap in postgraduate research**

Outside of the ‘women in science’ literature, there is very little large-scale research which quantifies the effect of gender on enrolment at postgraduate research level. Although there is certainly research which has drawn attention to the issue – and to the lack of coverage it has received (eg Leonard, 1997, 2001 and see section 9.4) – quantitative studies are lacking. In looking at the potential effect of socio-economic class on postgraduate participation, Wakeling (2009a) found that, controlling for academic factors such as degree attainment, socio-economic class, type of institution attended for first degree and subject discipline of first degree, women were substantially (and statistically significantly) less likely to progress to a higher degree by research than men. In comparison to entering employment, the odds of a man progressing to a research degree, controlling for other factors were 1.7 times higher than a woman. This gender gap is unexplained. It is also paradoxical if we recall that there is much attention to ‘failing boys’ in schools and the reasons why women persist in education more often (section 9.1 above) and also O’Leary and Sloane’s (2005) finding that the financial return to a doctoral degree is much higher for women than men (section 4.3.2). As with the investigation of socio-economic class, a further question is whether later transitions into postgraduate research also show gender disparities.

By way of contrast, Mastekaasa (2005), in a study of virtually the entire cohorts of doctoral students in Norway, 1981 – 1996, found only a moderate gender difference, which was partially associated with higher attainment by men at first degree level (although the remaining difference was unexplained). Perna (2004) found a small but significant gender difference in doctoral enrolment in the US, controlling for other factors.

### **9.4 Gender and doctoral study ‘close up’**

Detailed consideration of the doctoral experience is out-of-scope for this review. However it is worth observing that there is a large literature on women’s experience of doctoral study, written by or about current doctoral students. Although these are the women who have ‘survived’ into doctoral study and beyond, their reported experiences may suggest reasons why other women might choose not to pursue postgraduate research. It is also worth

noting that there are few if any such testimonies by men – or indeed if there are they do not mention gender as a difficulty in the negotiation of doctoral study. Among the difficulties reported by women in this research are lack of role models, a macho or laddish work environment, sexual harassment, the attitude of intimate partners or other friends and relatives, family commitments (which again are typically absent from male narratives) and emotional distress (Asmar, 1999; Cole and Gunter, 2010; Johnson-Bailey, 2004; Johnson-Bailey and Cervero, 2008; Kurtz-Costes *et al*, 2006; Leonard, 1997, 2001; Rai and Critzer, 2000; Ülkü-Steiner, *et al*, 2000).

One objection to considering the *emotional* aspect of the decision to enrol or not on a postgraduate research degree might be that it seems too insubstantial for inclusion in a research synthesis. In a sense, that reaction substantiates part of the point of the literature on the experience of doctoral study is trying to make, that such matters are often ignored, when they can have real consequences for participation.

## 10 OTHER ISSUES IN ACCESS TO POSTGRADUATE RESEARCH

### 10.1 Family

Postgraduate research students are, by definition, older than undergraduates. Many will seek to enter postgraduate research in their later twenties or early thirties. This may also be a time when they are considering setting up home with an intimate partner and/or starting a family. Combining postgraduate research study with family responsibilities is likely, given the current working culture of higher education and possibly the funding arrangements, to present a considerable challenge. It has been suggested that, given the stereotypical expectation that women undertake the largest share of domestic responsibilities, many women are dissuaded from participating in postgraduate research study as they do not see it as compatible with their family aspirations. In particular, some have pointed to an expectation that postgraduate and early career researchers are geographically mobile and free of care commitments (Crossouard, 2009; Grummell *et al*, 2009).

Nevill *et al* (2007) found that parents were less likely to enrol in graduate school in the US than the childless, although mothers were more likely to enrol than fathers. In Wakeling's survey of postgraduates, over 80 per cent of research students were childless; indeed the mean number of children per student was just 0.34! Women were slightly more likely to be childless than men.<sup>29</sup> Research in the USA shows that birth rates for postgraduate women have risen in the period 1970 – 2000 but are not yet comparable to the general population (Kuperberg, 2009). A Swedish study found that postgraduate men and women had family aspirations, but often sought to defer these until after their studies (Skoog Svanberg *et al*, 2006).

There is very little research which examines this issue directly and we know of none in the UK specifically. As this does not have high visibility as an issue, it is quite possible that support policies for postgraduate parents are not fully developed. US research suggests this is the case (Lynch, 2008; Springer *et al*, 2009). A more detailed examination of this issue in respect of UK postgraduate research study is called for.

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<sup>29</sup> A friend pointed out to one of the authors that all except one of the parents on their postgraduate research programme were male, despite the gender balance of the programme being roughly 50/50.

## 10.2 Disability

Access to postgraduate study for students reporting a disability is also under-researched. According to the Premia project at the University of Newcastle-upon-Tyne ([www.premia.ac.uk](http://www.premia.ac.uk)), about six per cent of first-year research students reported a disability in 2004/05, compared to just over seven per cent of undergraduates. Given that there is an inevitable time lag between the two levels, this suggests that disabled students, *at the aggregate level*, approaching equality in entry to research degrees. However there is clearly a need for a far more detailed understanding in this area, not least related to the kinds of disabilities students are reporting and the experience of such students as they enter postgraduate research.

## 10.3 Sexuality

Very little is known about the experience of Lesbian, Gay Bisexual and Transsexual (LGBT) people in accessing postgraduate research study. A special issue of the *Lesbian and Gay Psychology Review* (volume 10, number 1, 2009) addresses “coming out in higher education”. The Equality Challenge Unit (2009b) has investigated LGBT experience in higher education, reporting on a large online survey, focus groups and interviews with LGBT staff and students in higher education. Some 7 per cent of respondents were postgraduate research students. One issue identified for postgraduates was feeling ‘stuck in the middle’ when it came to support, between LGBT networks for employees and networks and societies focussed on younger, undergraduate students.

## 11 A NOTE ON MULTIPLE (DIS)ADVANTAGES

The approach adopted in this review has been to treat each potential dimension of inequality in terms of widening participation separately. In real life of course we do not *experience* gender, ethnicity, socio-economic class or any other such characteristic separately, but rather as part of our whole identity as a person. In the same way, any disadvantage in participation in postgraduate research degrees may be felt in multiple ways, or it may even be partly 'hidden' (for example being a white male might mean socio-economic disadvantage is not experienced in the same way as for a Pakistani female).<sup>30</sup> This complexity of different characteristics and their effects on inequality of opportunity have been recognised by the government in creating a single Equality and Human Rights Commission which brings together former equal opportunities bodies related to gender, ethnicity and disability.

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<sup>30</sup> Sociologists refer to this complex interaction of advantage and disadvantage as 'intersectionality'.

## 12 CONCLUDING REMARKS

What overall impression can we derive from the synthesis of evidence on widening participation from undergraduate to postgraduate research degrees? A clear conclusion is that, especially compared to the evidence base for access to undergraduate study, there is a need for further research into a number of aspects of access to research degrees. In particular, we need better to understand the whole process of entry to postgraduate research degrees, from initial perceptions of the qualification, through information gathering, application and entry. A prospective longitudinal research design, such as that used by the *Futuretrack* study, would represent a substantial improvement on studies conducted to date because it would allow the characteristics of those qualified for research degree study to be examined whilst the graduates are tracked through their continued education (or lack of it). In this way the potential effect of background variables such as gender, ethnicity and social class could be ascertained, as could the role of prior academic attainment, funding and subject of study. Examining the role of the application process itself in entering research degree study will help to determine whether differences in participation are related to patterns of demand or are affected by variations in success rate for different groups.

To support further research, there is also a clear need for improved data about some aspects of postgraduates' backgrounds. Much could be achieved by linking postgraduates' student records to their undergraduate record and we endorse the recommendation contained in the Postgraduate Review that this be further investigated by the appropriate bodies. This could provide data about academic attainment, prior subjects studied and institution attended. However there may also be a need for further data collection in connection with prior (and current) labour market activities of research students.

Although there is a comparative absence of research on widening participation from undergraduate to postgraduate research degrees, the synthesis has been able to point to some interesting trends in certain areas. Firstly, expansion at postgraduate research level has been much smaller in both absolute and relative terms than expansion at other levels of higher education, particularly on taught postgraduate programmes. This is especially the case if only UK-domiciled students are counted. The distribution of postgraduates across institutions and subjects is quite different at research-degree level, there being a shift to STEM subjects and a concentration in a small number of institutions.

The role of prior attainment appears paramount in entry to a research degree, mirroring findings in research on initial access to higher education. However

the role of first degree institution is more ambivalent, particularly in relation to social class differences. On the one hand, attending a selective, research-intensive institution may be considered a kind of proxy for academic ability and a predisposition for research degree study; on the other, this might indicate that opportunities are being closed off to those from certain backgrounds at the point of initial entry to higher education.

That said, gender differences in entry to research degrees gave perhaps the greatest cause for concern, followed perhaps by ethnic group differences. This represents a contrast with initial entry to higher education (at least at the aggregate level). Perhaps unexpectedly, social class differences were less pronounced in immediate entry to research degree study, although more research is required on later transition to postgraduate research by social class background, where there are some indications of a re-emergence of inequalities. Moreover, we did not find evidence of a straightforward effect of financial factors on entry to research degrees. Again, these findings give some clear indications of directions for future research.

To conclude, we would wish to underline the importance of continuing to develop an understanding of the factors affecting transition from undergraduate to postgraduate research degrees. This is vital if the three concerns identified at the outset of this report – social justice, widening the talent pool and adopting effective arrangements for the organisation of national research capacity – are to be addressed. Research degrees should not be thought of as simply an esoteric minority pursuit, but instead as an important part of the intellectual and scientific life of the country, preparing a new generation to contribute to a knowledge-based society.

## 13 APPENDIX: ACTIVITIES AND SEARCH STRATEGY

### 13.1 Activities

Paul Wakeling attended an initial project briefing with NCCPE and ESRC in November 2009. During the project we provided an interim report to NCCPE/ESRC on our initial findings (January 2010). This interim report was shared with the Postgraduate Review commissioned by BIS. Paul Wakeling also made an independent submission to the Postgraduate Review on widening participation to taught postgraduate study. Advice was provided to the Postgraduate Review on gaps in the available data about postgraduate students for discussions with HESA and a submission was also made to the Office for National Statistics' Census Output Consultation concerning the provision of data on postgraduates via the 2011 Census of Population. Paul Wakeling gave evidence at a public hearing of Lord Browne's Independent Review of Higher Education Funding and Student Finance at the University of Leicester in May 2010.

### 13.2 Literature searching

A number of different sources for literature on widening participation from undergraduate to postgraduate research degrees were consulted.

#### 13.2.1 *Hand searching: libraries*

Hand searches of material on access to postgraduate research degrees were carried out at the Institute of Education, University of London and the Education Library, University of Oxford, during January 2010. We are grateful to both those libraries and to Vanya Gallimore of the JB Morrell Library at the University of York for their assistance.

Hand-searching can be an effective means of identifying texts which are missed by keyword searches. However despite a thorough search at both libraries, few additional sources were identified in this way. This is most likely due to the general absence of research in the area of the review.

#### 13.2.2 *Hand searching: journals*

We identified the top ten most relevant scholarly journals for the research synthesis based on our professional knowledge of the area and hand searched their contents for the last decade. The journals searched were:

- British Educational Research Journal

- British Journal of Educational Studies
- British Journal of Sociology of Education
- Handbook of Higher Education Theory and Research
- Higher Education (including online first)
- Higher Education Policy
- Higher Education Quarterly
- Oxford Review of Education
- Research in Higher Education (including 'online first')
- Studies in Higher Education (including 'online first')

Using this approach we did identify some relevant sources, but these were largely already known to us.

### 13.2.3 *Electronic databases*

We searched a range of electronic databases.

[www.theses.com](http://www.theses.com) was searched using keywords of *postgraduate*, *graduate*, *doctora\**, *PhD*, *access and (education or study)*, *research student\** and *participation*. Whilst these keywords returned plenty of hits (between 28 and 1,035 for particular searches), no theses relevant to the review were found within these results. Those studies which related to doctoral education were largely about the social psychology of research degree study, the doctoral experience or factors affecting success of students conditional on starting a research degree. These areas were out of scope for the review.

We searched the British Education Index (BEI) and the Web of Science, using keywords *postgraduate*, *graduate*, *PhD*, *doctora\$*, *research student\$* and *research degree*. We restricted our search to articles published since 1999. Again, the number of results generated ranged from 18 to 528, but only three new sources were identified in this manner. Keyword searches via Google Scholar also proved fruitless; however this tool was very useful in finding further research from suggestions made by experts (see section 13.2.5 below), using the 'cited by' links.

### 13.2.4 *Public and voluntary organisations*

We searched for relevant reports and publications published by government bodies, representative organisations and professional associations which related to the review. This was a web-based search, although in some cases we telephoned for more information. Some of these were suggested by members of the steering group for the review. The following organisations' web-pages were searched:

- British Academy
- Demos
- Department for Children, Schools and Families (DCSF)
- Department of Business, Innovation and Skills (BIS)
- HEFCE
- Institute of Physics
- National Postgraduate Committee<sup>31</sup>
- National Union of Students
- The Royal Society
- The Royal Society of Chemistry
- The Sutton Trust
- UK Resource Centre for Women in Science
- University and College Union

Again, these searches did not generate new material in themselves, although contacts made with organisations did generate some additional references.

#### *13.2.5 Expert contacts*

Finally we identified and contacted a number of people who have published in related areas or who have a high standing in higher education and/or widening participation research. Many contacts responded that they were unaware of much research in the area, confirming one of the main findings of the review. A few respondents suggested new references or put us in touch with colleagues who were able to help us out. We are particularly grateful to Helen Perkins at the Society for Research into Higher Education for forwarding our request to members of the Society; this resulted in some interesting 'leads'. Ann Mullen of the University of Toronto was also very helpful in providing new and interesting references relating to postgraduate study in North America which we were then able to use to generate further references using Google Scholar's 'cited by' feature. The expert contacts proved the most fruitful source of references of all the searches we conducted.

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<sup>31</sup> The National Postgraduate Committee appears to be in abeyance and we were informed by NUS that the organisation is likely to be dissolved at a future date.

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## LIST OF ACRONYMS

AHRC	Arts and Humanities Research Council
BIS	Department of Business, Innovation and Skills
BME	Black and Minority Ethnic
DELNI	Department for Employment and Learning Northern Ireland
DIUS	Department for Innovation, Universities and Skills
DLHE	Destination of Leavers from Higher Education Survey
ECU	Equality Challenge Unit
ESRC	Economic and Social Research Council
HEFCE	Higher Education Funding Council for England
HEIPR	Higher Education Initial Participation Rate
HEPI	Higher Education Policy Institute
HESA	Higher Education Statistics Agency
LGBT	Lesbian, Gay, Bisexual and Transgender
NCCPE	National Co-ordinating Centre for Public Engagement
NPC	National Postgraduate Committee
NS-SEC	National Statistics Socio-Economic Classification
NUS	National Union of Students
OST	Office of Science and Technology
RAE	Research Assessment Exercise
RCUK	Research Councils UK
SET	Science, Engineering and Technology
STEM	Science, Technology, Engineering and Mathematics
UCAS	Universities and Colleges Admissions Service

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