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Are postgraduate qualifications the 'new frontier of social mobility'?

Paul Wakeling and Daniel Laurison

Abstract

We investigate the relationship between social origin, postgraduate degree attainment, and occupational outcomes across five British age-group cohorts. We use recently-available UK Labour Force Survey data to conduct a series of logistic regressions of postgraduate (masters or doctorate) degree attainment among those with first degrees, with controls for measures of degree classification, degree subject, age, gender, ethnicity and national origin. We find a marked strengthening of the effect of class origin on degree- and occupational attainment across age cohorts. While for older generations there is little or no difference by class origin in the rates at which first-degree graduates attain postgraduate degrees, those with working-class-origins in the youngest age-group are only about 28 per cent as likely to obtain a postgraduate degree when compared with their peers from privileged origins. Moreover, social origin matters more for occupational destination, even among those with postgraduate degrees, for those in younger age groups. These findings demonstrate the newly important, and increasing, role of *postgraduate* degrees in reproducing socio-economic inequality in the wake of the substantial

expansion of undergraduate and postgraduate education. Our findings lend some support to the Maximally Maintained Inequality thesis, suggesting that gains in equality of access to first-degrees are indeed at risk from postgraduate expansion.

Keywords: higher education, maximally maintained inequality, occupational attainment, postgraduates, social class, social mobility.

Words: 8,355

The last quarter century has seen rapid growth in postgraduate student numbers. In the UK for instance, postgraduate numbers grew from about 15,000 in 1960 to well over half a million in 2010.¹ Postgraduates now comprise a greater proportion of the total student body – almost one quarter in 2010, up from one in fifteen in 1960, a pattern repeated across the world (Morgan 2014; Wakeling 2010). However, the attention of social scientists and policy makers has focussed almost exclusively on undergraduate participation. If the growth of educational participation is itself a ‘quiet revolution’ (Baker 2014) then in terms of social science research at least, postgraduate expansion has been a mere whisper.

Research has established an enduring and near-ubiquitous relationship between social class origin, educational attainment and social class destination, referred to as

'persistent inequality' (Shavit and Blossfeld 1993; Pfeffer 2008). Educational expansion has not undone this relationship between origin, inequality of access and outcome (Goldthorpe and Jackson 2008) but it has been suggested that the strength of the relationship has dissipated over time (Breen 2010). In particular, Raftery and Hout (1993) argued that expansion at a given educational level tends to reduce inequality only at the point where advantaged groups approach 'saturation'. That is, a ceiling effect applies: when the most advantaged approach very high rates of participation there is little scope for further expanding their entry and disadvantaged groups begin to catch up. Under this Maximally Maintained Inequality (MMI) thesis, expansion causes class inequalities to 'pass up' to the next educational level. Furthermore, expansion in access to an educational level can also lead to the emergence or emphasising of 'horizontal' differences within that level, referred to as Effectively Maintained Inequality (EMI) (Lucas 2001). Thus as access to initial higher education expands overall, inequalities begin to increase in access to particular subjects, types of qualifications or sets of institutions.

The MMI thesis has been challenged at tertiary level by Bar Haim and Shavit (2013). Using European Social Survey data, they claim educational expansion did not reduce inequality of opportunity for cohorts born from the 1950s to 1970s. In the UK, Boliver (2011) has shown that inequality in access to first degrees since the 1960s has seen both MMI and EMI in operation. Other recent British evidence suggests that MMI applies when looking at absolute levels of education, but this substantially

reduces or disappears if using a relative measure, although only men were investigated (Bukodi and Goldthorpe 2015). These findings are further supported by studies showing substantial differences in the likelihood of those from different social class backgrounds enrolling in the most prestigious British universities and more lucrative outcomes for those who do enter the more elite institutions (Macmillan, Tyler and Vignoles 2014; Sullivan et al. 2014; Wakeling and Savage 2015).

Some sociologists argue that educational expansion is itself driven by processes of social closure and class reproduction. Collins' (1979) credential inflation thesis holds that twentieth century educational expansion in the US arose not from increasing demands for highly skilled labour but rather through the value which educational credentials began to hold in the competition for the best-rewarded positions. Wolf (2002), writing about the UK, calls this the 'tyranny of numbers': the recognition by young people (and their parents) that those with a degree on average attain the best labour market (and other) rewards. Not participating comes to represent progressively higher risk as the proportion of graduates in the population grows, tending to favour the marginal benefits of seeking higher education. Roberts (2010) argues this has led to higher education becoming a 'normal' part of the lifecourse for middle-class children, where *not* participating is the unusual decision. Postgraduate education is not currently the modal choice for UK graduates however.

We can derive two predictions about postgraduate education from these theories. Firstly, we would expect the expansion seen at undergraduate level to prompt expansion at postgraduate level. Secondly, if educational inequalities are indeed maximally maintained, we would expect that expansion at undergraduate level sees a corresponding increase in inequality of access to postgraduate study. In other words, on the back of undergraduate-level expansion, postgraduate participation will grow, but it will grow disproportionately among the most socially-advantaged groups.

A small number of previous studies have investigated the expansion of postgraduate study over time. Lindley and Machin (2013) show growing postgraduate participation across the 1958 and 1970 birth cohorts. This trend is corroborated across three birth cohorts by Bukodi and Goldthorpe (2015) who find the proportion of men with postgraduate qualifications increased from 0.9% among 1946 births to 2.1% for 1958 births and 4.2% for those born in 1970. Lindley and Machin (2013) also show that inequality in the attainment of postgraduate qualifications increased between the 1958 and 1970 birth cohorts, although they focus on parental income deciles rather than occupational social class origins. Intriguingly they also find that, contrary to classical economic theory, whilst the supply of postgraduates has increased, the apparent wage premium for postgraduate qualifications has also increased. Others have also found income premia for postgraduate degree holders (Conlon and Patrignani 2011; Engelage and Hadjar 2008; Mertens and Rübken 2013).

Studies of inequalities in access to UK postgraduate study for contemporary cohorts are relatively rare, but tend to suggest differences by social class background, albeit less severe than those seen in earlier transitions (D'Aguiar and Harrison 2016; HEFCE 2013a; Triventi 2013; Wakeling and Hampden-Thompson 2013). There are similar findings for the US (Mullen, Goyette and Soares 2003), Canada (Zarifa, 2012), and Norway (Mastekaasa 2006). However, studies outside the UK tend to deploy parental education as the measure of social origin, rather than occupational social class.

A countervailing trend is the tendency for social class background effects to decline over successive transitions. This pattern of so-called 'waning coefficients' was first proposed by Mare (1980, 1981) who found little influence of social class on the transition into graduate education, given a college degree. Stolzenberg (1994) confirmed this finding. However, in her longitudinal study of higher education expansion and social inequality in the US, Torche (2011) found a U-shaped pattern of social class background effects. Inequalities declined over successive educational transitions, but re-appeared in the form of inequalities in earning outcome by class of origin for postgraduate degree graduates.

Our article seeks to address two related gaps in evidence from these previous studies. First, the most recent British cohort available to researchers using longitudinal datasets was born in 1970 and hence would have begun graduating

from first degrees from 1991. This coincides with the very beginning of a sustained period of more rapid expansion of undergraduate and postgraduate enrolments in the UK (see Figure 1, below). While some of the 1970 cohort will have entered undergraduate and/or postgraduate study later than the de facto minimum ages of 18 and 21 respectively,² the key point is that at the typical age for initial higher education participation in the UK³ this cohort experienced very different structural conditions regarding higher education participation than the cohorts which followed. Second, more recent research about progression into and beyond postgraduate study is heavily right-censored in that it contains very limited data about the outcomes of those with postgraduate qualifications. Thus for later cohorts we have previously been limited to data about the early labour market destinations of postgraduate degree holders (within one, or sometimes three years).

We exploit newly-available nationally-representative cross-sectional data on occupational social class origin, destination and education from the UK Labour Force Survey 2014. We use this dataset to address the following questions:

1. Are there differences in the probability of attaining a postgraduate degree according to social class of origin?
2. What are the outcomes obtained by those with postgraduate qualifications in terms of occupational social class?

3. Do the outcomes obtained by those with a postgraduate degree vary according to social class of origin?
4. How do the patterns identified in 1 – 3 above vary across age cohorts and gender?

Postgraduate study in the UK

British postgraduate qualifications are designed to be taken by individuals who have already obtained a first degree. They can be crudely divided into two types: taught qualifications; and those awarded principally on the basis of a research project.

Among the most common examples of each are the one-year full-time taught masters degree and the three-year research doctorate, the PhD. The distribution of students across these types of qualification varies by field of study and the student's intention. Some programmes exist to extend subject knowledge; some are intended to qualify a graduate for a particular profession; some target those in work who wish to enhance their position; and others are intended as preparation for a career in research (HEFCE 2013b).

Figure 1 shows overall growth in undergraduate and postgraduate enrolments in the UK since 1960. This clearly demonstrates the huge growth in postgraduate numbers over the last quarter century, with numbers quadrupling in the decade from 1990

and continuing to grow at a faster rate than undergraduates during 2000 – 2010. The UK government estimated an initial postgraduate participation rate of 8% in 2012-3, compared to an initial higher education participation rate of 49% in the same year (BIS 2014).

[FIGURE 1 HERE]

This substantial growth in postgraduate enrolments has proceeded in spite of an apparently difficult student funding environment. Unlike at undergraduate level, there is very little public support available to UK graduates to undertake postgraduate study. Whereas undergraduates can access state loans to cover tuition and living costs, some three quarters of taught postgraduates and one third of research students are self-funding. Studentships, where available, are awarded on grounds of academic merit rather than financial need and can be exceptionally competitive.

Changes to undergraduate student finance in England have prompted the expression of concerns about access to postgraduate study. This is because future graduates will hold very substantial debts due to the trebling of undergraduate tuition fees to £9,000 introduced in 2012. Coupled with the scarcity of funding for postgraduate study, commentators have suggested that only the most advantaged graduates will be able to afford further study, meaning that the advantages accruing

to those with postgraduate qualifications will be out of reach for many. Since this potentially undermines the strenuous efforts of many in British higher education to promote social mobility through widening access to (initial) higher education, it has been labelled a 'new frontier of social mobility' (Lampl 2013) and a 'social mobility timebomb'.⁴ These concerns lie behind the UK government's decision to introduce loans for postgraduate study in England from 2016 (BIS 2015).

Data and methods

We use the UK Quarterly Labour Force Survey (LFS) for July – September 2014 to investigate these questions. LFS is a nationally representative sample survey of the working-age population ($n = 75,477$). It operates a rotating panel design whereby respondents are included in the sample for five consecutive quarters before being replaced.

For the first time, respondents in the July-September 2014 quarter were asked about the occupation of their main income-earner parent when they were 14. Responses are reported as SOC 2010 codes, which we grouped into the seven-class National Statistics Socio-Economic Classification,⁵ which is itself based on the Erikson-Goldthorpe-Portacero model (Rose and Pevalin 2003). To simplify comparisons, we grouped these into NS-SEC 1 origin (higher manager & professional parent), NS-SEC 2 origin (lower manager & professional), NS-SEC 3 to 5 origin (intermediate

occupations) and NS-SEC 6-7 origin (routine & semi-routine occupations). LFS also contains a range of other relevant variables about respondents' educational background, employment history and current occupation. Crucially, the LFS variables recording a respondent's highest educational qualification distinguish between first and postgraduate degrees, a level of detail available in few other datasets (such as the UK Population Census). We obtained a Special Licence to link respondents across the relevant waves of the survey (which also covered access to 4-digit SOC 2010 codes).

We grouped respondents into ten-year pseudo-cohorts. The cut-off points for these have been set to fit loosely around key historical events, including changes in higher education policy. Table 1 sets this out in detail. We adopted 1990 as the key pivot point since the 'take-off' for postgraduate enrolments seen in Figure 1 began then. We excluded respondents under the age of 25 at the time of the survey since they would have had insufficient time to complete undergraduate and postgraduate qualifications and enter the labour market. We exclude individuals over the age of 69 for whom there is a reduced set of data available through LFS. We also exclude immigrants who arrived after the age of 15 and survey respondents currently in full-time study.

[TABLE 1 HERE]

Here we should recognise some limitations to the LFS dataset. There is right censorship in two ways. Firstly, research on young people's transitions into work and adulthood finds much occupational volatility before the age of 30 (Berrington, Tammes and Roberts 2014) and social mobility researchers typically take the mid-thirties as the point by which occupational stability has been attained (Bukodi and Goldthorpe 2009). This means those in the youngest age group may well experience further occupational mobility in future. Similarly, some individuals in the sample may yet obtain further higher education qualifications. Some of those with only first degrees at present may obtain a postgraduate qualification, and some non-graduates may yet obtain a first degree. We can be reasonably confident that much postgraduate study is undertaken before the age of 30: HEFCE (2013b) reports that 60% of postgraduate students in England and Northern Ireland are aged under 30 and that nearly half of taught-course postgraduates entered aged under 25⁶. We are unable to account for differential emigration by those qualified to postgraduate level, who are, by definition, missing from LFS.

A further issue is that the detail of the data on postgraduate qualifications is not optimal. We lack information on the type of institution which awarded first and postgraduate degrees. Other research suggests this may be salient (Boliver 2011; Sullivan et al. 2014; Wakeling and Hampden-Thompson 2013; Wakeling and Savage 2015) and it certainly would have been relevant to an evaluation of the EMI thesis. Furthermore, although we can distinguish between masters and doctoral graduates,

the numbers of the latter are small and we soon encounter empty cell and sampling error issues. It is possible – indeed likely – that there are differences between those holding a masters degree and a doctorate. Conlon and Patrignani (2011) find differences between masters and doctoral graduates in earnings and employment outcomes. However, Lindley and Machin (2013) were also unable to distinguish between postgraduate degrees in their study based on the 1970 Birth Cohort Study. A much larger sample of postgraduate degree holders would be required to investigate this in more detail. Accordingly, we combine masters and doctoral graduates in our analysis.

Our analysis proceeds in three stages. First we look at changes in undergraduate and postgraduate rates of qualification over time, including by gender and social class origin. We then examine differences in social class destination for those with postgraduate qualifications in comparison to those with only a first degree. In doing so, we investigate whether occupational outcomes for postgraduate degree holders vary by social class origin and gender, and over time. Finally, we fit logistic regression models to investigate the association of various characteristics with holding a postgraduate qualification.

Results

Class origins, undergraduate and postgraduate qualifications

Table 2 and Figure 2 re-confirm with LFS data what are very long-standing findings for the UK and elsewhere. They show that the proportion of the working-age population qualified to degree level has been rising over time. Older cohorts are less likely to hold a degree than younger cohorts, rates declining with age. The youngest cohort has a slightly lower prevalence of graduates, although this could be due to a small amount of right censorship and perhaps a slightly higher emigration rate. In Figure 3 we see that increases in participation have benefitted those of all social class origins, but that social class differentials in degree attainment have remained fairly stable across four decades. Very similar results have been reported in other analyses (Egerton and Halsey 1993; Boliver 2011).

[TABLE 2 HERE]

[FIGURE 2 HERE]

[FIGURE 3 HERE]

Looking instead at the prevalence of postgraduate degrees among the working age population, the picture changes somewhat. Figure 4 shows that the general trend for postgraduate degrees tracks those for first degrees seen in Figure 2; however, the increase is not as steep and unlike at first-degree level, women do not overtake men in their rate of holding this qualification. In fact, women's rate of holding postgraduate

degrees levels off for younger cohorts, whereas men's continues to increase, re-opening a gender gap.

[FIGURE 4 HERE]

[FIGURE 5 HERE]

Entry to postgraduate degrees is almost always restricted to those already in possession of a first degree. Hence it is instructive to examine rates of possession of a postgraduate degree *conditional on* holding a first degree. Under MMI, we would expect that, when the overall prevalence of first degrees is relatively low, class differentials in postgraduate degree qualification would be smaller, since the marginal utility of a postgraduate degree is low. In other words, when relatively few people hold a first degree then there is unlikely to be much advantage in also holding a postgraduate degree, except perhaps in very specialised segments of the labour market (such as university research and teaching). When a first degree is more common, as is the case with our younger cohorts, then the relative advantage of a postgraduate degree increases as a means of distinguishing oneself from others in the labour market. Here, research among graduates has highlighted a perception that a degree is 'not enough' (Tomlinson, 2008).

Figure 5 shows that the rate of entry to a postgraduate degree has actually declined relative to the increase in first-degree holders. Even considering there may be some

right censorship for younger cohorts, the picture does not fit well with the credential inflation thesis. This pattern would help to explain the puzzle detected by Lindley and Machin (2013) as to why the postgraduate wage premium continued to increase even while supply of postgraduates increased. The absolute number of postgraduate degree holders increased, but relative to the population of first-degree holders, it did not. We should note here that the postgraduate student numbers seen in Figure 1 cover all postgraduates, not just postgraduate degree students. There is also a time lag between first degree enrolment and postgraduate enrolment which means that growth at first-degree student numbers will not affect postgraduate student numbers for at least three years.

Turning to patterns of growth by social class origin (Figure 6), we see these differ to the pattern for first degrees in Figure 3. Specifically, postgraduate degree-holding among those from 'higher managerial and professional' origins increased among younger cohorts, including those born in the period after Lindley and Machin's (2013) data ends (1971 onwards). The trend for those from lower professional and managerial origins tracks a similar trend among older individuals, but tails off after mid-1970s births. Those from intermediate and semi/routine origins see little change across time. In the latter group in particular, there is very little difference in the proportion with postgraduate degrees among those born in the 1950s and 1980s: only about 3% of each group are so qualified, compared to around 20% of higher managerial and professional origin individuals born in the 1980s. Put another way, the growth

gradient for each social class in Figure 3 is steeper than in Figure 6, but the difference in gradient between the two figures is greatest for the lower occupational groups.

[FIGURE 6 HERE]

[FIGURE 7 HERE]

The patterns shown in Figure 7 are consistent with the MMI hypothesis. Among the oldest group – those who would most likely have attended university in the 1960s – between one fifth and one quarter of first-degree graduates also hold a postgraduate degree. There is little difference across social class origin, with Intermediate origin graduates actually having a slightly higher rate of qualification than those from other backgrounds, although none of the social class differences are statistically significant for this group. We then see the emergence and then steepening of class-of-origin differentials with each successive cohort. So there are small but not statistically significant differences between Higher managerial and professional origin graduates and others among those aged 53 to 62. These become more pronounced and monotonically declining for graduates aged 43 to 52, before settling in to a sharp – and recognisable – pattern of social class inequality for the two youngest cohorts, where confidence intervals do not (or only just) overlap. Thus as expansion begins to increase, with increased prevalence of first degrees in younger cohorts, so possession of a postgraduate degree seems to become a site for the reproduction of social class inequalities. Another way to conceive of this emerging difference is to note that for

the oldest cohorts, British higher education was a small, elite system. For the younger groups it is, in Trow's (2010) terms, a mass system in which arguably those with postgraduate degrees emerge as a new elite group. Thus working-class students who made it to higher education 40-50 years ago were already an unusual and highly-selected group. Their first-degree counterparts in later years were, while still underrepresented, unlikely to have been quite so highly-selected and hence inequality and under-representation does indeed appear to have 'passed up' a level.

We fitted a series of logistic regression models to predict holding of a postgraduate degree conditional on holding a first degree (Table 3). These were fitted for all graduates in the working age population and then separately for each of our age cohorts. The models include background characteristics known to be associated with educational transition, including social class of origin, immigrant status, ethnicity, age and gender. Importantly, they also add academic factors such as first-degree attainment and field of study, since these are known to be strongly predictive of progression from a first degree to a postgraduate degree (Wakeling and Hampden-Thompson, 2013). The model re-confirms the importance of field of study and first-degree classification, with higher-attaining graduates and those in the experimental sciences, engineering and law having higher predicted rates of postgraduate degree attainment. However, controlling for these additional factors, we see that the patterns observed in Figure 7 still hold. The prevalence of postgraduate degrees varies little across social class of origin for the oldest cohorts and differences are not statistically

significant. However, for younger groups the differences are both larger and statistically significant. The trend for working-class-origin groups (NS-SEC 6-8), and to some extent those from Intermediate occupational backgrounds (NS-SEC 3-5) shows the same worsening position over time relative to Higher managerial and professional occupations seen in Figures 6 and 7. Those of Lower managerial and professional occupational origin do not differ significantly from graduates of Higher managerial and professional origins until the youngest cohort where a difference appears. This pattern is illustrated in Figure 8, which displays the average marginal effects of origin (and the 95% confidence intervals for these) for the five separate age-group regressions.

For all age groups, graduates of an immigrant background (first or 1.5 generation) were significantly less likely to have achieved a postgraduate degree. However, patterns are inconsistent across ethnicity. While some groups, notably, Pakistani, Chinese and Black graduates tend to have a greater likelihood of obtaining a postgraduate degree than the White British group, in almost all cases this is not statistically significant. Other groups have unstable fortunes across age groups, perhaps due to small cell sizes in the analysis. Gender is associated with holding a higher degree, but is also unstable across age groups. Differences are notable among the older cohorts however, and statistically significant too.

[TABLE 3 HERE]

[FIGURE 8 HERE]

We have seen then, that there are clear social class differences in rates of both first-degree and postgraduate degree qualification. However, it is also clear that, unlike for first degrees where social class differentials have remained relatively stable in the face of expansion, at postgraduate degree level differentials have increased considerably for more recent cohorts.

Postgraduate degrees and social class destinations

Having looked at the relationship between social class origin and entry to postgraduate education and its change over time, we now turn to consider the social class destinations of postgraduate degree graduates. Specifically, we look to see whether there is (a) any dividend for postgraduate degree graduates in terms of social class destination; and (b) whether the social class destinations of postgraduate degree graduates vary by social class of origin.

To investigate this, we fitted a logistic regression model to predict the likelihood of a higher managerial or professional destination, conditional on having achieved a first degree, with an interaction term for social origin and education (postgraduate or university-level only); results are shown in Table 4. The model contained controls for gender, age (within cohort), first degree subject and grade, ethnicity and birth country.

[TABLE 4 ABOUT HERE]

The results confirm existing understanding of pathways into NS-SEC 1 positions. First, subject discipline is important. This echoes Conlon and Patrignani's (2011) findings, among those from many other studies. Similarly, consistent with a body of previous research is women graduates' substantial disadvantage in obtaining a NS-SEC 1 destination. While this disadvantage reduces across cohorts in the model, it nevertheless remains stark, even among the youngest group in our data. Graduates from Black, Asian and minority ethnic backgrounds are less likely to obtain a NS-SEC 1 destination, again confirming many previous studies. However, few of the coefficients are statistically significant here, likely due to small cell sizes. Interestingly, first-degree classification is only a statistically significant predictor among the youngest cohort, where the benefit of holding a first-class honours degree is strongest (as is the disbenefit of holding lower second-class honours). This fits with the EMI hypothesis in that qualitative differences within a level of education are expected to become more important as participation at that level increases.

Our main focus in this study is the link between social class origin, postgraduate qualifications and destination. The results here from our model are complex. Among those with a first degree only, there is a fairly stable pattern across the age groups whereby first-degree-only graduates of NS-SEC 1 origin are more likely to obtain NS-SEC 1 destinations than their NS-SEC 2 – 8 peers. This is only consistently statistically

significant for the two younger cohorts. However, except for the youngest cohort, all postgraduates have a higher likelihood of a NS-SEC 1 destination than first-degree graduates. Thus controlling for other factors, postgraduates aged 53-62 from NS-SEC 6 – 8 had odds of a NS-SEC 1 destination almost twice those of a first-degree-only graduate from NS-SEC 1. Put simply, it appears from our model that for all except the youngest cohort, a postgraduate qualification improves the chance of a NS-SEC 1 destination regardless of social class origin. For the youngest group, class-of-origin effects appear to change, such that only NS-SEC 1 postgraduates have an edge in entry to NS-SEC 1 destinations, although the results are not statistically significant, again possibly a cell-size issue. For our youngest cohort then, NS-SEC 1 origin graduates are more likely to enter postgraduate study than their peers from other origins, and having made that transition are more likely to attain a NS-SEC 1 destination than their postgraduate peers from other backgrounds.

Discussion

Is postgraduate study the 'new frontier' of social mobility? We have found some evidence in support of this statement, but the use of the definite article is perhaps too strong. Our results suggest that postgraduate qualifications are *a* new frontier for social mobility in the UK. However, they remain something of a social mobility niche: even with perfect meritocratic access, the scope for postgraduate qualifications to improve the lifechances of more than a small minority of the most disadvantaged in

society is limited. Nevertheless, this is a niche which has undoubtedly grown in importance in recent years. We see that social class inequalities extend beyond first degrees into entry to postgraduate degrees. We also see that women's remarkable progress in attaining first degree qualifications has not – at least not *yet* – extended into postgraduate degrees. When we investigate patterns across age groups, we see that among older groups social class of origin saw a weak and statistically insignificant relationship with postgraduate degree attainment. However successive age groups see social class inequalities emerging and steepening, with the youngest age groups seeing sharper and statistically significant differences across social class of origin.

These findings are to some extent consistent with MMI. As we see increased attainment of undergraduate qualifications overall and among disadvantaged social classes, then we also start to see social class inequalities appearing in postgraduate degree qualifications. It seems that reduced inequality of educational opportunity at first-degree level develops in parallel with *increased* inequality of educational opportunity at *postgraduate* degree level. Mullen, Goyette and Soares (2003) argued that Mare's (1980) and Stolzenberg's (1994) finding of little class inequality in the transition from first degree to postgraduate degree from US data did not extend to later cohorts. Our findings suggest a similar pattern for the UK, with earlier cohorts seeing few class inequalities in the transition to a postgraduate degree, conditional on holding a first degree, but with later cohorts seeing a growing social class inequality in this transition. At the very least, these results present a strong case for sociologists

interested in the relationship between education and social mobility to include postgraduate qualifications as a separate level in their analyses, rather than halting investigation at the point of initial entry to higher education. Ignoring the highest level risks missing important emerging social class inequalities. While the language used by policy think tanks may tend toward the hyperbolic, their overall point is sound: we should pay attention to access to postgraduate education.

Contrary to MMI however, we found that, conditional on obtaining a first degree, rates of postgraduate degree-holding declined across cohorts. Growth in postgraduate qualification-holding arises from growth in the size of the first-degree-graduate pool rather than an increase rate of entry. A plausible explanation is that during the early period of post-war higher education expansion, funding for postgraduate study was relatively abundant in comparison to today, meaning the cost of entry was relatively low. At the same time, faced with a strong graduate labour market the urge to remain in or return to study would be much more likely to be intrinsically than extrinsically motivated. In other words, the *meaning* of postgraduate study is likely to have altered in the context of the significant change in the size, shape and prominence of higher education more generally.

The picture is also more equivocal for the variation in apparent subsequent impact of postgraduate qualifications on those from different social class origins. Here we saw hints of a growing class inequality in destination over time, given postgraduate degree

attainment. However, the differences did not reach the conventional threshold of statistical significance, and so we cannot claim with confidence that these are real differences in the population. This means that we cannot confirm Torche's (2011) finding of U-shaped inequality, with class differences re-emerging among advanced degree holders, although we do not think our findings refute her argument either. They hint at the 'class ceiling' recently identified among the socially mobile by Laurison and Friedman (2016). They show that the traditional professions are more likely than other salariat professions to be self-reproducing and that the upwardly mobile suffer a salary penalty in comparison to socially stable individuals in the same class of destination. This would fit with our findings in that postgraduate degrees are more often linked to professional than managerial occupations. Early findings from a study of recent graduates suggest a strong association between graduate parents and children entering postgraduate courses (Wakeling, Hancock and Hampden-Thompson 2015). As we noted above, we were limited in our investigation of class destinations for postgraduate degree graduates by sample size. Researchers will need larger samples of the very highly qualified to reach more definitive conclusions about this question.

One potential limitation of our analysis is that it is cross-sectional, making it inherently difficult to separate age effects from period effects. One potential alternative explanation might be that class effects are strongest among the newest graduates and decline for later entry to postgraduate degree study. So, close to the point of first-

degree graduation those from the most advantaged class backgrounds may be able to draw on parental support, especially financial, which is not available to their graduate peers from disadvantaged social classes. Since most previous British taught postgraduate degree students received no sponsorship from the state or elsewhere (HEFCE 2013b), students have needed to draw on their own and their family's resources to afford further study. Upwardly mobile graduates may take longer to secure sufficient resources, but if they are able to do so later in life they may be able to catch up when older. Other available evidence does not support this interpretation. Firstly, social class inequalities seem to be weakest in very swift transition to postgraduate study after the first degree, but widen over time (HEFCE 2013a; Wakeling 2009) – this is not consistent with disadvantaged origin graduates 'catching up'. Secondly, those who enter postgraduate degrees at an older age are more likely to be sponsored by their employer than younger students. Employees receiving sponsorship from their employer are highly likely to be in salariat positions, which of course are more likely to be filled by those from advantaged social class origins, even controlling for level of education. Thirdly, about two thirds of those with postgraduate degrees in our LFS data had obtained their highest qualification by the age of 30, rising to 85 per cent by 40 years of age. Together these three known trends tend to lend support to a period effect rather than age effect interpretation. Finally, we should acknowledge that there is a need for further research which looks at employer practices and the 'postgraduatisation' of careers; in other words *how* postgraduate qualifications come to offer a labour market advantage.

In conclusion, we have shown that social class inequalities not only persist at postgraduate level, but have widened over time. Sociologically, this demonstrates yet again the Hydra-like qualities of social stratification in relation to education, whereby inequalities which seem to be dissipating in the long term can re-appear in new ways. In terms of policy, it provides support to the case for recent efforts in England to expand the agenda of ‘widening participation’ in higher education from undergraduate to postgraduate study. However, it also points to the need for awareness of the credential inflationary risks which educational expansion seems inevitably to carry. Winning the battle at the next frontier of education and social mobility may ultimately simply move the frontier.

¹ Of the 578,705 postgraduate registrations in 2010-1, 374,305 were UK-domiciled students.

² Around one-quarter of the 1970 Birth Cohort Study 42-year follow up survey respondents (2012) were graduates; one fifth of the graduates had also obtained a postgraduate degree. Only around 100 of the cohort of almost 10,000 respondents had achieved a postgraduate degree since age 30.

³ Most new HE entrants are aged 18 or 19 (BIS, 2014).

⁴ Alan Milburn, UK government’s Independent Reviewer on Social Mobility and Child Poverty. Interview in HECSU (2012), p .5.

⁵ We used Table 10 of the Office for National Statistics’ NS-SEC2010 derivations tables to achieve this (available at: <http://www.ons.gov.uk/ons/guide-method/classifications/current-standard-classifications/soc2010/ns-sec-2010-derivation-tables.xls>, accessed 9 August 2015).

⁶ In the LFS, 65% of those with postgraduate degrees attained them by age 30.

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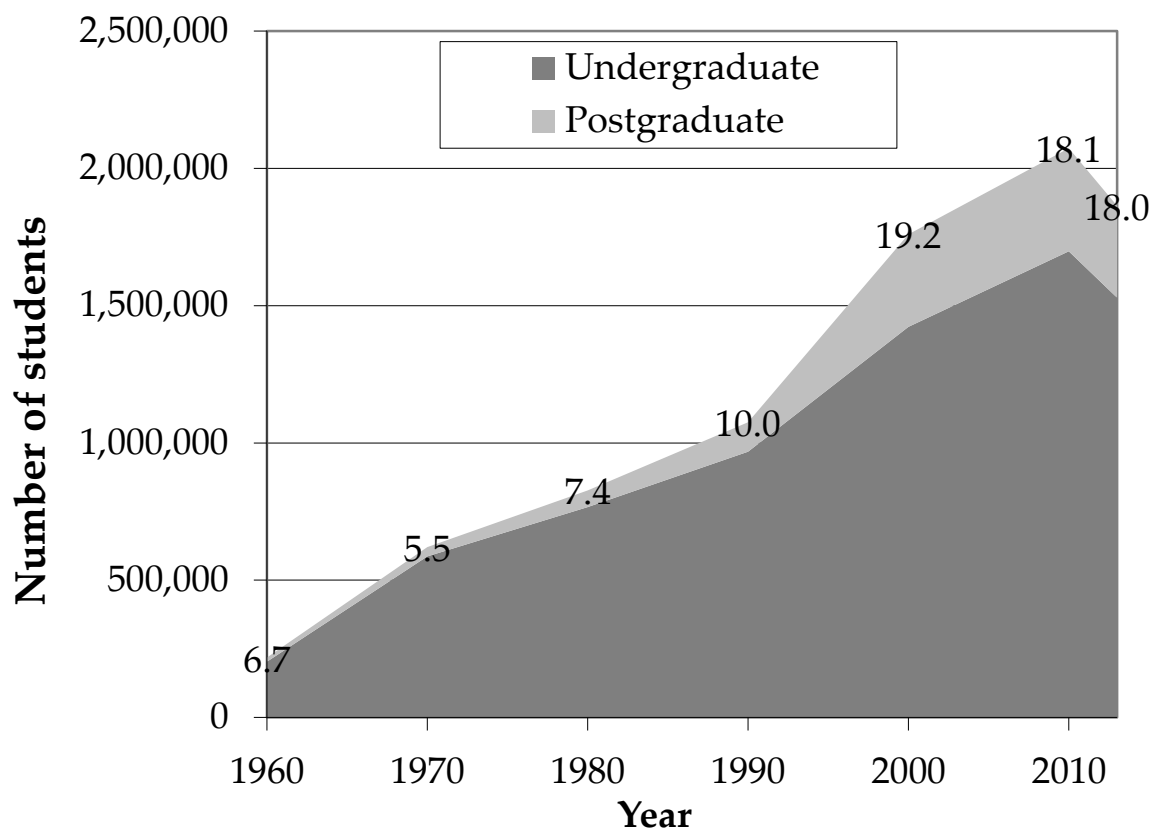
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Tables and Figures

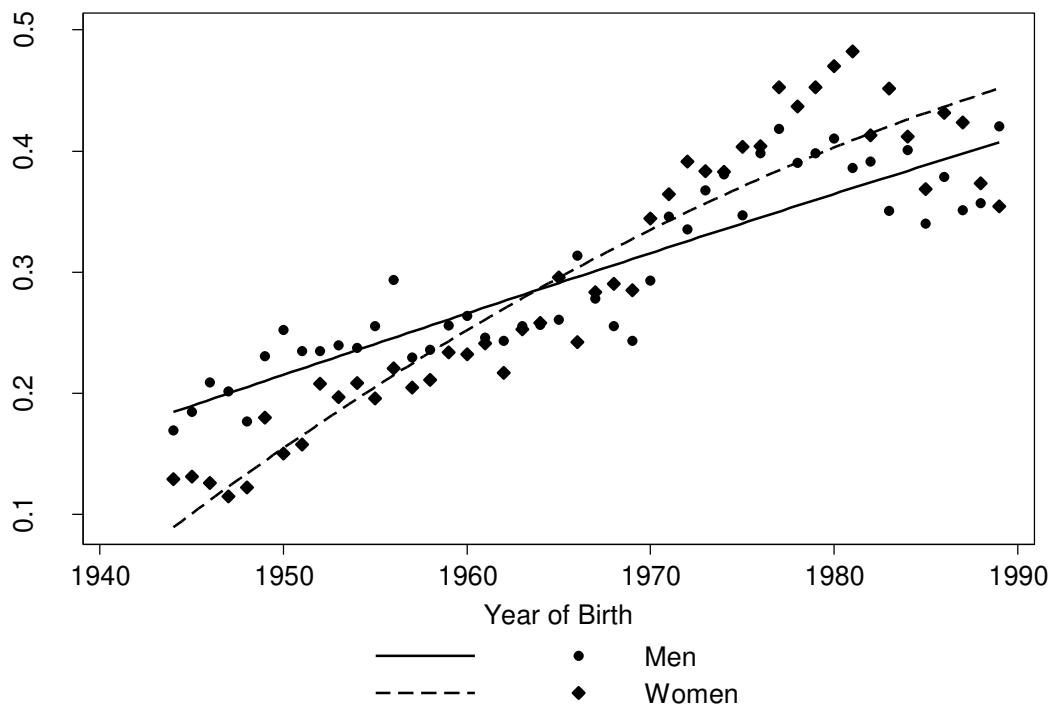
Figure 1: UK student numbers by level, 1960 – 2013



Note: numbers on chart denote per cent of students who were postgraduate

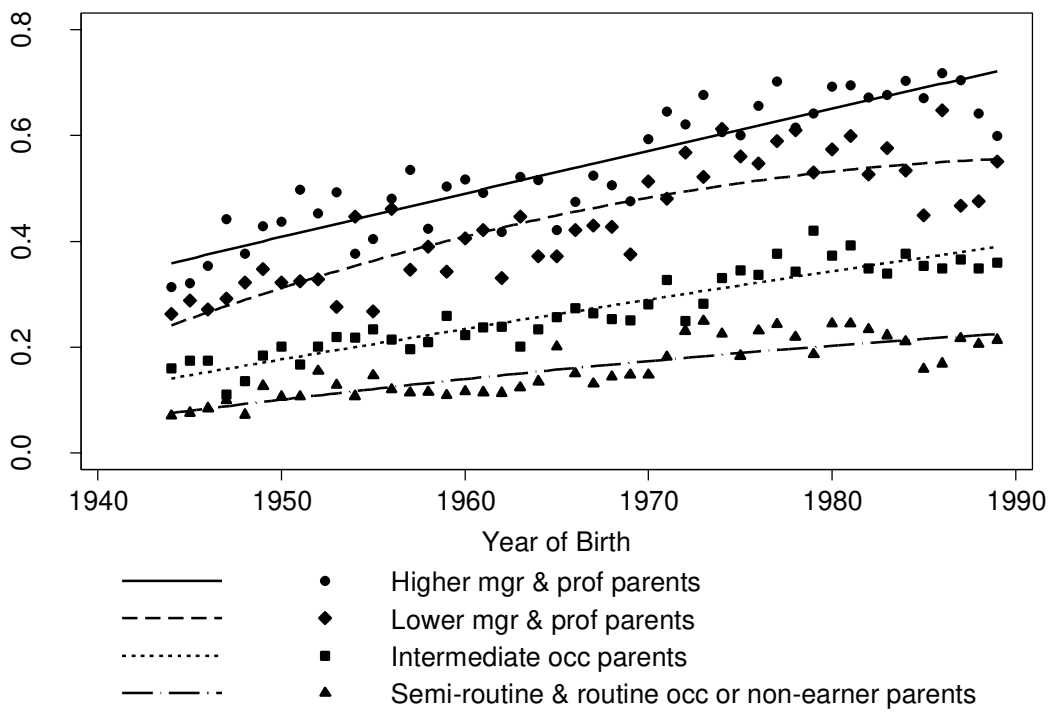
Source: Wakeling (2009); Higher Education Statistics Agency Student Record (2007-8 – 2009-10)

Figure 2: Proportion of working-age population holding a first degree by gender and birth year



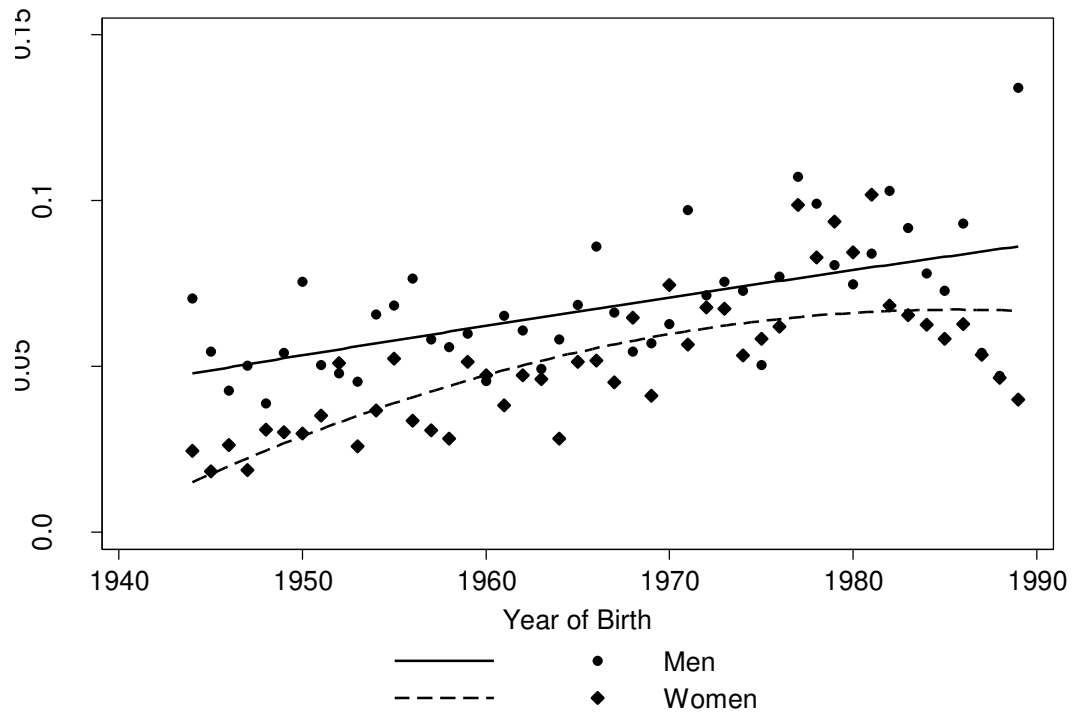
Note: Dots represent the proportion of each gender with a first degree for each birth year; lines are the predicted values from a linear regression of percent university attendance on birth-year and birth-year squared. $n=22,888$ women and 20,004 men, survey weighting used. Figures 2-6 created using *lgraph* by Timothy Mak in Stata 13.

Figure 3: Proportion of working-age population holding a first degree by social class origin and birth year



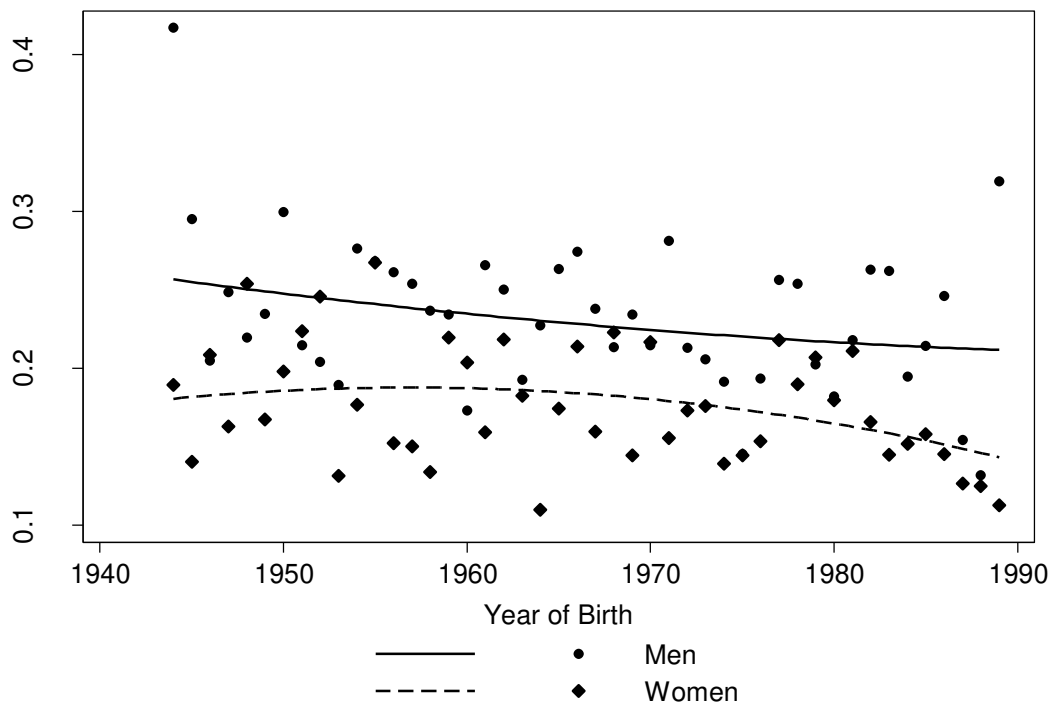
Note: Dots represent the proportion of each social class origin with a first degree for each birth year; lines are the predicted values from a linear regression of percent university attendance on birth-year and birth-year squared. $n=5,768$ Higher Managerial and Professional parents, 6,253 Lower Managerial & Professional parents, 15,843 Intermediate Occupations parents, and 15,046 Semi-Routine, Routine, and Unemployed parents; survey weighting used.

Figure 4: Proportion of working-age population holding a postgraduate degree by gender and birth year



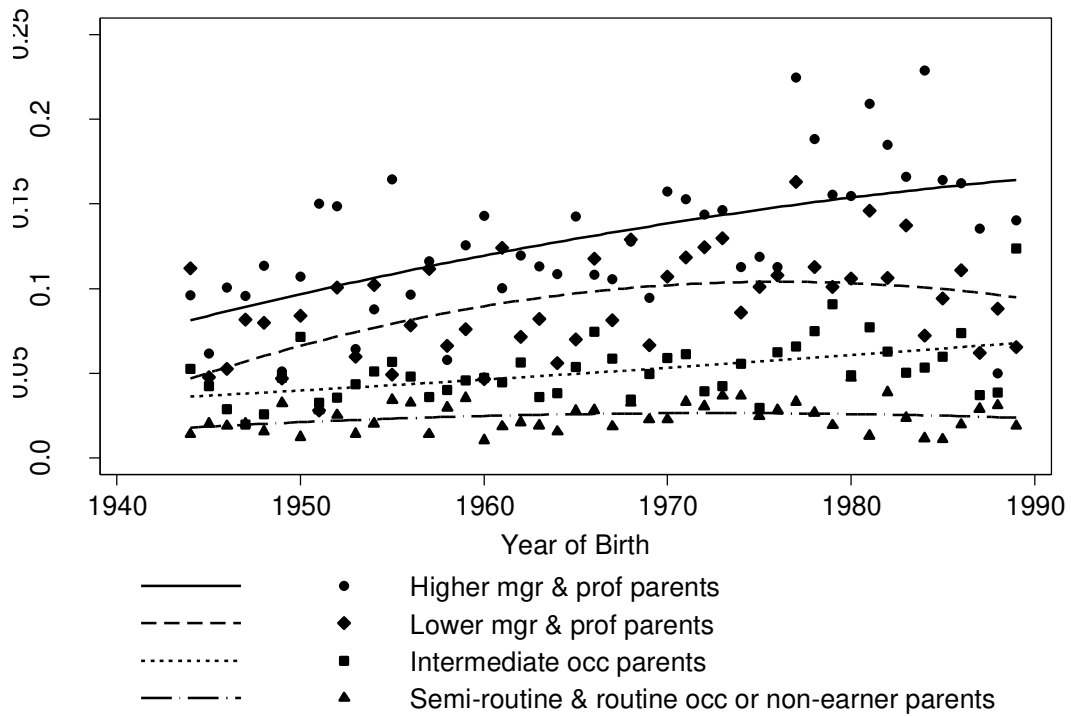
Note: Dots represent the percentage of each gender with a postgraduate degree for each birth year; lines are the predicted values from a linear regression of percent university attendance on birth-year and birth-year squared. $n=22,888$ women and 20,004 men, survey weighting used.

Figure 5: Proportion of working-age first-degree graduates holding a postgraduate degree by gender and birth year



Note: Dots represent the percentage of each gender with a higher degree for each birth year; lines are the predicted values from a linear regression of percent university attendance on birth-year and birth-year squared. $n=6,484$ women and 5,705 men, survey weighting used.

Figure 6: Proportion of working-age population holding a postgraduate degree by social class of origin and birth year



Note: Dots represent the percentage of each social class origin with a university degree for each birth year; lines are the predicted values from a linear regression of percent university attendance on birth-year and birth-year squared. $n=3,131$ Higher Managerial and Professional parents, 2,774 Lower Managerial & Professional parents, 4,054 Intermediate Occupations parents, and 2,230 Semi-Routine, Routine, and Unemployed parents; survey weighting used.

Figure 7: Per cent of first-degree graduates holding a postgraduate degree by age group and social class origin

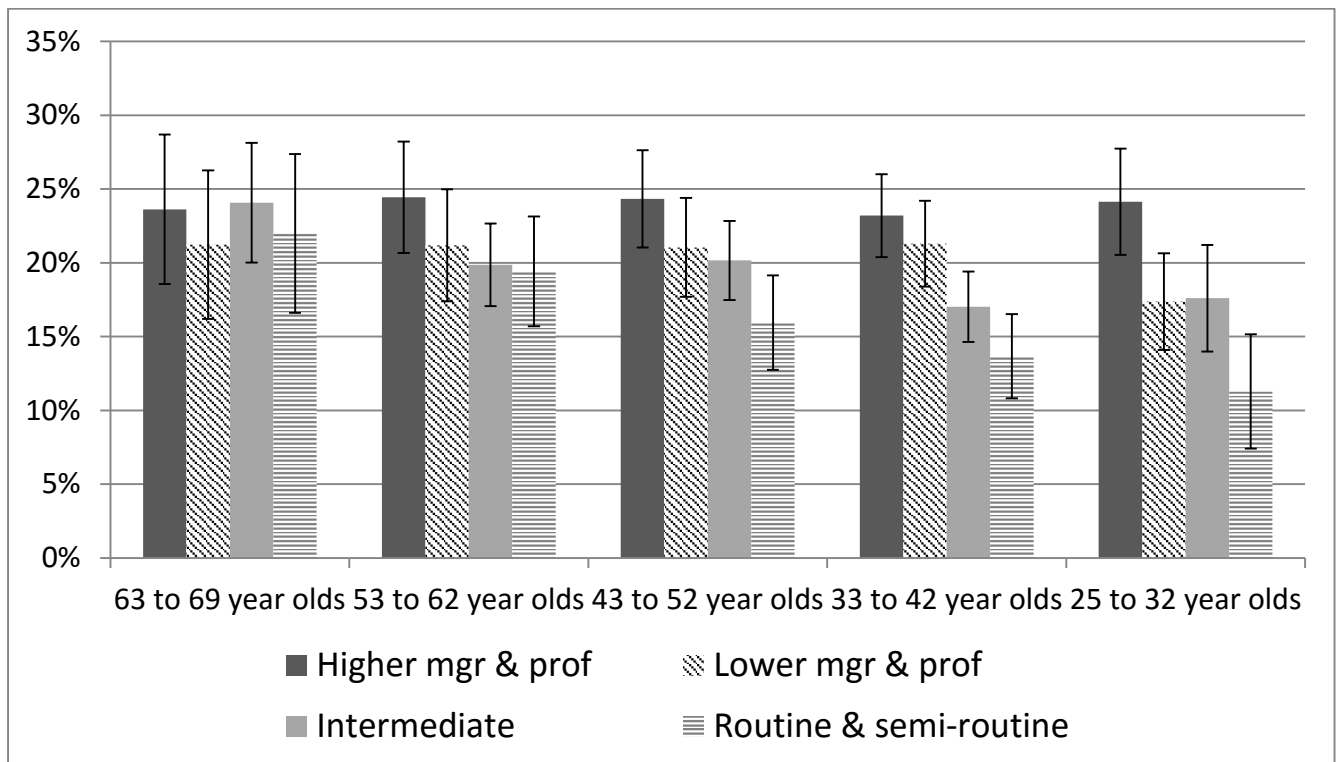
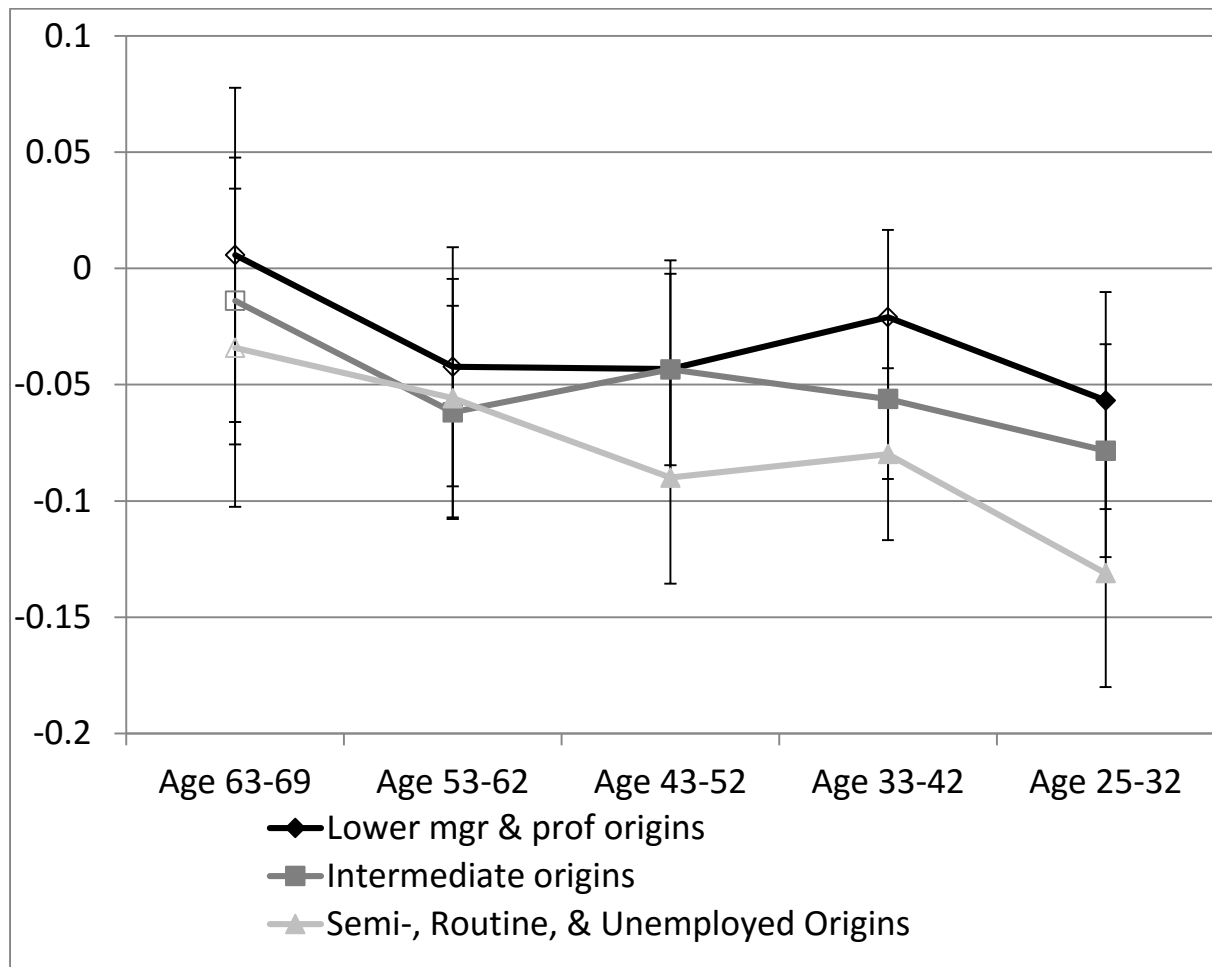


Figure 8: Average Marginal Effects of social class origin on probability of holding a postgraduate degree for five age cohorts



Note: Average Marginal Effects of class origin, relative to Higher managerial & professional origins, from logistic regressions reported in Table 3, with 95% confidence intervals (non-significant coefficients indicated with hollow markers).

Table 1: pseudo-cohorts created for LFS July – September 2014 respondents

Age band	Age at 31 August 1990	Likely going to university in...	Key events	Years covered
25-32	2-9	1999-2006	New Labour, fees	8
33-42	10-19	1989-1998	1988 Education Act; new universities	10
43-52	20-29	1979-1988	Thatcher government	10
53-62	30-39	1969-1978	OPEC crisis	10
63-69	40-46	1962-1968	Robbins expansion	7

Table 2: Percent of working-age population with first degree or higher, by age cohort

	University degree		Postgraduate degree		Postgraduate Degree of those with First degree	
	women	men	women	men	women	men
25 to 32 year olds	40.8%	37.3%	5.9%	8.3%	14.5%	22.3%
<i>standard error</i>	0.9%	1.0%	0.4%	0.6%	1.0%	1.6%
33 to 42 year olds	42.1%	38.1%	7.6%	7.8%	18.2%	20.6%
<i>standard error</i>	0.7%	0.8%	0.4%	0.4%	0.9%	1.1%
43 to 52 year olds	28.0%	27.1%	4.9%	6.6%	17.5%	24.2%
<i>standard error</i>	0.6%	0.7%	0.3%	0.4%	1.0%	1.3%
53 to 62 year olds	21.5%	24.8%	4.0%	5.8%	18.6%	23.4%
<i>standard error</i>	0.6%	0.6%	0.3%	0.4%	1.2%	1.3%
63 to 69 year olds	13.6%	21.1%	2.6%	5.4%	19.4%	25.4%
<i>standard error</i>	0.6%	0.7%	0.3%	0.4%	1.8%	1.7%

Table 3: Logistic Regression of whether or not obtained postgraduate degree, conditional on having a first degree, by age group

	All Ages	25-32	33-42	43-52	53-62	63-69
<i>Origins (vs NS-SEC 1 Parents)</i>						
NS-SEC 2	0.777**	0.622*	0.850	0.742	0.753	1.039
NS-SEC 3-5	0.679***	0.506***	0.630**	0.741*	0.653**	0.910
NS-SEC 6-8	0.531***	0.278***	0.502***	0.511***	0.683*	0.788
<i>Degree Class (vs 2:1)</i>						
NA (e.g. foreign degree)	3.508***	5.314***	4.808***	2.801***	2.705***	2.419***
Pass	0.339***	0.544	0.222**	0.340**	0.469*	0.183***
Third	0.232***	(empty)	0.275*	0.361*	0.228**	0.210**
2:2	0.557***	0.388***	0.565**	0.629**	0.601**	0.551*
1st Class	1.413**	0.924	1.498	1.476	2.379***	1.463
<i>Degree Subject (vs Soc. Sciences)</i>						
Not Applicable/Don't Know	0.083***	0.047***	0.056***	0.114***	0.118***	0.090***
Health Sciences	0.820	1.286	0.685	0.892	0.843	0.835
Experimental Sciences	2.035***	2.581***	1.825***	2.623***	1.721**	1.793*
Engineering & Technology	1.561***	6.081***	1.990**	1.124	0.674	0.700
Law & Management	1.521***	1.305	1.416	1.800**	2.159***	1.097
Arts & Humanities	1.068	1.306	1.005	1.204	0.966	1.032
<i>Ethnicity (vs White)</i>						
Mixed/Multiple ethnic groups	1.195	0.958	1.056	1.739	1.378	(empty)
Indian	1.108	1.627	1.080	0.443	0.453	1.762
Pakistani	1.436	2.153	1.413	1.278	(empty)	(empty)
Bangladeshi	0.599	0.526	0.706	0.750	(empty)	(empty)
Chinese	1.649	1.918	0.814	1.750	7.443*	4.770
Any other Asian background	0.969	1.607	0.534	1.602	0.449	2.043
Black/African/Caribbean/Black British	1.311	0.671	1.718	1.104	2.099	(empty)
Other ethnic group	1.078	2.170	0.862	0.938	1.301	0.513
<i>Birth Country (vs England)</i>						
outside UK	1.545***	2.103*	1.789**	1.456	0.881	1.661
Northern Ireland	1.040	0.333	0.942	2.695**	0.689	0.571
Scotland	1.020	0.890	1.145	1.09	0.908	0.983
Wales	1.114	1.693	0.767	1.255	0.975	0.976
Age (in years)	1.013***	1.041	0.982	0.982	1.018	1.018
Female	0.773***	0.833	0.950	0.717**	0.745*	0.592**
Constant	0.160***	0.059**	0.429	0.692	0.139	0.148
N	10,634	1,805	3,089	2,499	2,028	1,165

Note: p<.05 = *, p<.01= **, p<.001=*** Coefficients reported are exponentiated, or odds-ratios (rather than log-odds).

Table 4: Logistic Regression of achieving occupation in NS-SEC 1, among those with first degree or postgraduate degree, by age group

	25-32	33-42	43-52	53-62	63-69
<i>Origin x Education: Reference NS-SEC 1 Origins, UG</i>					
NS-SEC 2 Origins, UG	0.58**	0.69**	0.71*	0.82	0.57*
NS-SEC 3-5, UG	0.48***	0.69**	0.78	0.78	0.80
NS-SEC 6-8, UG	0.39***	0.54***	0.72*	0.68*	0.65
NS-SEC 1 Origins, PG	1.24	1.94***	2.88***	1.96**	2.05*
NS-SEC 2 Origins, PG	0.91	1.51	1.46	2.55***	2.30*
NS-SEC 3-5 Origins, PG	0.67	1.72*	1.36	2.56***	1.89*
NS-SEC 6-8 Origins, PG	1.10	0.89	1.60	1.92*	1.80
<i>Degree Class (vs 2:1)</i>					
NA (e.g. foreign degree)	1.44*	0.85	1.00	0.78	1.17
Pass	1.79	1.05	1.03	1.08	1.16
Third	0.66	0.64	1.36	0.79	1.29
2:2	0.62*	0.87	1.07	0.73	0.96
1st Class	1.98**	1.24	1.11	1.62*	1.01
<i>Degree Subject (vs Soc. Sciences)</i>					
Not Applicable/Don't Know	2.49***	2.39***	1.81***	1.55*	1.00
Health Sciences	3.03***	3.37***	2.29***	2.36***	1.94
Experimental Sciences	3.93***	3.75***	2.20***	1.67**	1.30
Engineering & Technology	4.49***	3.44***	2.66***	2.66***	1.89*
Law & Management	2.99***	4.06***	2.77***	2.23***	1.46
Arts & Humanities	1.18	0.92	1.23	0.81	0.81
<i>Ethnicity (vs White)</i>					
Mixed/Multiple ethnic groups	0.44	0.93	0.92	0.70	(empty)
Indian	1.17	1.51*	0.77	0.47	0.40
Pakistani	0.67	0.41*	0.70	(empty)	(empty)
Bangladeshi	0.88	0.11*	1.41	(empty)	
Chinese	0.84	1.28	1.56	0.61	(empty)
Any other Asian background	(empty)	0.45*	0.52	0.33	(empty)
Black/African/Caribbean/Black British	1.03	0.38**	0.39*	0.20**	(empty)
Other ethnic group	0.78	0.85	0.64	0.48	0.81
<i>Birth Country (vs England)</i>					
outside UK	0.60*	0.91	1.08	1.61*	1.81
Northern Ireland	0.91	1.12	0.95	0.94	0.70
Scotland	0.64	0.82	0.93	1.09	1.09
Wales	0.74	0.84	0.94	0.88	1.16
Age (in years)	1.16***	0.99	1.01	0.96*	0.95
Female	0.59***	0.48***	0.40***	0.38***	0.39***
Constant	0.00***	0.61	0.28	3.97	10.79
<i>N</i>	1,824	3,089	2,499	2,028	1,160

Note: $p < .05 = *$, $p < .01 = **$, $p < .001 = ***$ Coefficients reported are exponentiated, or odds-ratios (rather than log-odds).