THE UNIVERSITY CAREERS OF A SCIENTIFIC ELITE IN RELATION TO THEIR
CLASS ORIGINS AND SCHOOLING: FELLOWS OF THE ROYAL SOCIETY BORN
FROM 1900

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ABSTRACT

We report on continuing research on the UK scientific elite, intended to illustrate a proposed new approach to elite studies and based on a prosopography of Fellows of the Royal Society born from 1900. We extend analyses previously reported of Fellows' social origins and secondary schooling to take in their university careers as under- and postgraduates. The composite term 'Oxbridge', as often applied in elite studies, is called into question, as members of the scientific elite prove to have been recruited clearly more from Cambridge than from Oxford. Particular interest then attaches to the relation between Fellows' social origins and schooling and their attendance at Cambridge. Among Fellows whose university careers were made at Cambridge, those of more advantaged class origins and those with private schooling are over-represented, although in this, as in various other respects, including Fellows' field of study, family influences persist independently of schooling. One suggestive interaction effect is, however, found in that being privately educated increases the probability of having been at Cambridge more for Fellows from managerial than from professional families. Private schooling leading on to undergraduate and postgraduate study at Cambridge can be identified as the educational 'royal road' into the scientific elite; and Fellows coming from higher professional and managerial families alike have the highest probability of having entered the elite in this way. But the most common route turns out in fact to be via state schooling and attendance at universities outside of 'the golden triangle' of Cambridge, Oxford and London; and this route is far more likely to have been followed by Fellows of all other class origins than higher professional. The relation between the degree of social skew in the recruitment of an elite and the degree of social homogeneity among its members can be more complex than has often been supposed.

DATA AVAILABILITY STATEMENT

Data were collected by the authors solely for this project. The authors elect not to share data until the project finishes.

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INTRODUCTION

In a previous paper (Bukodi, Goldthorpe and Steinberg, 2022) we have analysed the social composition of the UK scientific elite, as represented by Fellows of the Royal Society born since 1900, in terms of Fellows' class origins and secondary schooling. We now move on to consider the university careers that they followed. As context, we begin by summarising the main findings of our earlier analyses.

First, across each of the seven ten-year birth cohorts that we distinguish, close to, or over, 30% of Fellows come from higher *professional* families; and this proportion rises to over 40% for the most recent cohort, those born after 1960. In contrast, the proportion of Fellows coming from higher *managerial* families is always substantially lower – not much above, or less than, 10% except for the oldest cohort, those born 1900-09.¹ Similarly, more Fellows have always come from lower professional than from lower managerial families. Thus, in the most recent cohort almost two-thirds of Fellows are from professional backgrounds of some kind as compared with only a fifth from managerial backgrounds. Further, there is also an increase, notably in the two most recent cohorts born after 1950, in the proportion of Fellows with at least one parent in an occupation, most often a professional one, involving some degree of scientific, technical, engineering or mathematical (STEM) knowledge or expertise. As regards Fellows of less advantaged class origins, over our three middle cohorts – Fellows born 1920-1949 – the proportion who were the children of small employers, own-account workers or wage-earning working-class parents averages around a quarter – i.e. a larger proportion than those coming from higher managerial families. However, recruitment from such less

¹ Included with higher managers are 'large employers' – i.e. with more than 25 employees – who are, however, predominantly the owners of still relatively small, often family, concerns, in the management of which they are directly involved.

advantaged families thereafter sharply declines, falling to less than 9% in the most recent cohort, and with the proportion of Fellows of working-class origins being more or less negligible. As a result of these changes, together with changes in the societal class structure, the composition of the Fellowship, which was previously *less* homogenous in terms of class origins than the population at large, is now more homogenous.

Second, across all birth cohorts between 40% and 50% of Fellows attended private secondary schools, although some shift is evident, especially among those with professional parents, away from private boarding to private day schools. However, the proportion of Fellows attending Clarendon schools², consistently a little under 10%, would appear low as compared with that found with other elites, such as the military or the legal (cf. Reeves et al., 2017). As would be expected, an association exists between Fellows' class origins and the type of their secondary schooling. Among Fellows of higher professional and managerial origins alike, the proportion who went to private schools is over two-thirds, while a majority of Fellows coming from other class backgrounds went to state schools – rising to over 85% of those of working-class origins.

Third, differences are revealed in the social origins of Fellows working in different research fields. Most notably, coming from *any other origins* than higher professional increases the relative probability of a Fellow being a chemist, while decreasing that of a Fellow working in a range of biological sciences, although this latter effect would appear to be weakening. The type of a Fellow's schooling modifies social origin effects on field of research but only to a quite

² The Clarendon schools are the nine 'public schools' whose finances and management were investigated by the Clarendon Commission, 1861-64, in view of what was taken to be their national importance: namely, Charterhouse, Harrow, Eton, Rugby, Merchant Taylors', St Paul's, Shrewsbury, Westminster and Winchester.

limited extent, thus suggesting that influences in some way associated with the class position of their families of origin are of independent importance in determining the choice of research field of individuals who come to attain scientific eminence.

A general conclusion that could be drawn from these results was that in the study of the formation and composition of elites, more *detailed* and more *disaggregated* analyses may be required than have often been produced in past research. For example, it has been widely supposed that recruitment to elites is simply structured by hierarchical class divisions. But, at least with the UK scientific elite, this is not the case. What emerges, as in fact it did in earlier research into the US scientific elite (Cattell, 1915; Visser, 1947), is the importance of distinguishing *within* more advantaged social classes between their different occupational components. In the UK, as was found in the US, professional families have been clearly, and quite persistently, more productive of outstanding scientists than have managerial families. Again, although a majority of the UK scientific elite from higher professional or managerial families did attend private schools, a still far from negligible minority went to state grammar or comprehensive schools. To take type of schooling as a convenient proxy for social origins, as has often been done (see, e.g., Social Mobility Commission, 2019), may then lead to a serious underestimation of the extent of class skews in elite composition. And further, the case of the UK scientific elite shows that attention has to be given to the possibility that, across different divisions of an elite, recruitment channels may significantly vary. In short, elites have to be treated as more complex collectivities in terms of their formation and composition than has been commonly the case.

With the foregoing in mind, we now seek to complement what we have learnt about the social origins and schooling of Fellows of the Royal Society with analyses of their university careers.

The questions on which we focus are the following. Which universities did Fellows attend at both undergraduate and postgraduate level? What association exists between their social class origins and their universities? How far and in what ways is this association mediated through their secondary schooling? How far do differences in these respects relate to the fields of research in which Fellows work? And, finally, what are the implications for the social composition of the UK scientific elite as we have sought to represent it?

DATA

In our previous paper, we have given an account of the development of the Fellowship of the Royal Society and also full details of how we have sought to collect data on Fellows in our target population. In short, we consider all Fellows born from 1900 onwards, whether deceased or still living, but with the exclusion of Foreign Members, Honorary or Royal Fellows and all Fellows whose last or most recent employment was not in the UK or whose research careers were, or have so far been, spent more outside of than within the UK. This population numbers 2112 Fellows – 1957 men and 155 women; and we have been able to obtain full information relevant to our present interests for 1681 Fellows – 1556 men and 125 women. That is, we have overall an almost 80% coverage. However, the small number of female Fellows precludes any detailed analyses by gender. Small numbers likewise preclude analyses relating to ethnic minorities. As remarked in our previous paper, Fellows are highly homogenous as male and white, as the Royal Society (2019) itself recognises.

For deceased Fellows, our information comes from published sources, primarily from the Royal Society's *Memoirs* but also from the *Dictionary of National Biography* and from obituaries and

other material available on the web. For the living, information comes primarily from a web-based questionnaire that was sent to all Fellows in our target population in late 2020, to which we received an almost 70% response; but, in the case of non-responses, we resort to *Who's, Who*, Debrett's *People of Today* and again to web material. In Table 1 we show the extent of the coverage we achieved on all variables that we use across the seven birth cohorts that we distinguish.

[Table 1]

It can be seen that we have fuller information for the deceased than for the living – i.e. for Fellows in earlier cohorts. However, tests we have carried out to see if differences occur in the information we obtain for deceased and living Fellows within the same birth cohort indicate that, if they exist at all, any such differences are very slight (Bukodi, Goldthorpe and Steinberg, 2022, Appendix 2). We therefore feel able to take our data as providing the basis for a prosopography – a collective biography – of the Fellows in our target population in regard to attributes of interest to us that is free of any serious descriptive bias. Consequently, and as in our previous paper, when we resort to the statistical modelling of our data, we do not apply tests of significance but focus on the size and pattern of the coefficients returned.

UNIVERSITIES

Across each of our seven birth cohorts some proportion of Fellows obtained their university education, whether at undergraduate or postgraduate level or both, outside of the UK (see Appendix Figure 1). These proportions are highest, reaching up to 20%, in the earliest cohort, born 1900-09, and in the latest cohort, born after 1960. What is chiefly reflected in the former

case is the influx of often eminent scientists from Germany, Austria and elsewhere in Europe during the later 1930s and, in the latter, the growing globalisation of science. However, in what follows, we confine our attention to those Fellows whose university education was within the UK.

In Figure 1, we show the distribution of the Fellows in question by university attended, at both undergraduate and postgraduate levels, distinguishing between Cambridge, Oxford, University College and Imperial College, London, other London colleges, other Russell Group universities, and the rest.³ It can be seen that undergraduate and postgraduate attendance fall in fact into quite similar patterns. What is of greatest interest is the importance of Cambridge as a source of the scientific elite – and especially in comparison with Oxford. In almost all birth cohorts, around 30% of Fellows were at Cambridge for their undergraduate or postgraduate education or for both, while over the first five cohorts no more than 15% were at Oxford, with this proportion then rising to 20% or a little over in the two most recent cohorts. Further, across the cohorts, with only one exception in the case of postgraduate study, the proportion of Fellows who went to other Russell Group universities also exceeds the proportion going to Oxford, though not to Cambridge. And Oxford was likewise less important in the university education of Fellows than was London overall, at both undergraduate and postgraduate levels, until with the two most recent cohorts the proportion attending London falls away.⁴

³ The Russell Group universities are a self-selected group of ‘leading research universities’ in the UK, established in 1994, and now comprising 24 institutions. Cambridge and Oxford are included along with several University of London colleges, which are now in effect independent universities in themselves. We treat Fellows as having attended Russell Group universities even if they did so before their designation as such in 1994.

⁴ The fact that in the three earliest cohorts 10% or more of Fellows are recorded as not having undertaken graduate studies is largely to be explained in two ways. First, undergraduates at Cambridge and Oxford who had outstanding results in their final examinations might immediately obtain College

[Figure 1]

We have here then a further instance in which disaggregation is called for and, in particular, confirmation is provided of the observations of McKibbin (1998: 249-50) to the effect that, in the context of elite studies, the composite term 'Oxbridge' needs to be used with greater caution than has often been the case. In his history of science in Oxford over the inter-war years, Morrell (1997: 381, 179, 186, 306) notes that while in physics the Cavendish Laboratory at Cambridge had been world-leading from the late nineteenth century, the Clarendon Laboratory at Oxford was for long 'widely regarded as moribund' and took a good while to recover. And although Oxford did eventually build up a reputation in physiology and biochemistry, it was still always in the shadow of Cambridge in these fields. Only in chemistry was Oxford able to 'feel superior' to Cambridge.

Indeed, in line with the old adage 'Cambridge for science, Oxford for the humanities', Halsey (1994: 605-6) was still ready to comment, not entirely in jest, that Oxford could be thought of as 'the best liberal arts college outside or inside America'. To this, Soares (1999: 109) has objected that in the two or three decades after World War II, Oxford transformed itself into 'a modern scientific university'. Over this period, Oxford was certainly very successful, and has continued to be successful, in raising its scientific standing to a high level, in contrast with the slow development of – and no little hostility towards – science that was previously in evidence. Nonetheless, whatever the future may hold, Oxford would still appear to lag clearly behind Cambridge as a recruiting ground of members of the present-day scientific elite.

Fellowships, and for the cohorts in question a doctorate was not essential for a research career. Second, students graduating in engineering, even if wishing to pursue a research career, often moved directly into employment in engineering firms rather than staying on at university.

UNIVERSITIES, SOCIAL ORIGINS AND SCHOOLING

We now turn to the question of what association exists between Fellows' social origins and the universities they attended. As in our previous paper, we treat social origins in terms of the class positions of Fellows' parents, using for this purpose a modified version of the National Statistics Socio-Economic Classification (Office of National Statistics, 2005), as shown in Table 2.⁵

[Table 2]

In Table 3, we show the distribution of university or type of university that Fellows attended by their parental social class, with all London colleges now being brought together. It can be seen that the associations between parental class and university attendance run on broadly similar lines at both undergraduate and postgraduate levels, if being generally somewhat weaker in the latter case. The most notable features that emerge are the following.

Fellows coming from higher professional and managerial, NS-SEC Class 1, backgrounds, are clearly over-represented among those having attended Cambridge – though scarcely so among those having attended Oxford. And a point of further interest is that with Fellows from higher professional families that are also STEM families⁶ the percentage having attended Cambridge is slightly higher than with their non-STEM counterparts, but in the case of attendance at Oxford the percentage of Fellows coming from STEM families is clearly *lower* than that coming from non-STEM families. STEM parents, it could be, have a greater awareness of Cambridge's

⁵ Again as previously, where we have information – i.e. on occupation and employment status – that allow us to establish the class positions of a Fellow's father and mother and these differ, we apply the 'dominance' method (Erikson, 1984). However, over the period covered, parental class does in the large majority of cases derive from father's class.

⁶ At least one parent was in an occupation that involved some degree of scientific, technical, engineering or mathematical knowledge and expertise.

scientific superiority *vis-à-vis* Oxford. Fellows of Class 1 origins are then most notably under-represented among those attending other Russell Group universities and the rest. And, conversely, it is Fellows of all other origins than Class 1, apart from those of lower professional origins, who are under-represented among those going to Cambridge – and markedly so in the case of those of working-class, NS-SEC Class 6 and 7, origins. Fellows from these less advantaged class backgrounds are most notably over-represented at other Russell Group universities and the rest.

[Table 3]

To give some idea of the extent to which disparities exist by class of origin, Figure 2 shows odds ratios, calculated from the data of Table 3, comparing the relative chances of Fellows of Class 1 or of Class 6 and 7 origins having attended Cambridge rather than Oxford, London or any other university. At the undergraduate level, it can be seen that even when the comparison is simply between Cambridge and Oxford, Fellows of Class 1 origins are almost twice as likely to have gone to Cambridge rather than to Oxford than are Fellows of Class 6 or 7 origins. And when the comparisons are between having attended Cambridge rather than London or Cambridge rather than any other UK university the corresponding odds ratios sharply increase – to six times and to approaching eight times greater, respectively. At the postgraduate level, the odds ratios are smaller but in the Cambridge-London and Cambridge-other comparisons still far from negligible.

[Figure 2]

We next ask how far an association also exists between the type of Fellows' secondary schooling and their university attendance. In this regard, Table 4 provides the basic information.

Given the association we have shown above between Fellows' class origins and their universities and, in our previous paper (Bukodi, Goldthorpe and Steinberg, 2022), the association also existing between their class origins and their type of secondary schooling, what emerges from Table 4 is overall much as might be expected. However, what in the present context is significant is that while Fellows who were privately schooled are over-represented, as undergraduates, at both Cambridge and Oxford, this is far more strongly the case with Cambridge – and especially so with Fellows who had been to Clarendon schools. This over-representation is then offset by under-representation at London, at other Russell Group universities, and at the rest. With Fellows who had attended state schools, essentially the reverse situation is then found.

At the postgraduate level, the association between Fellows' type of schooling and their universities is for the most part on a similar, if weaker, pattern, although privately schooled Fellows are no longer under-represented at London – an at least partial explanation for which is suggested below (n. 9).

[Table 4]

Figure 3 shows odds ratios analogous to those of Figure 2 but with the private/state school comparison replacing the Class 1/Classes 6 and 7 origins comparison. When the university comparison is between having attended Cambridge rather Oxford, Fellows who were at private schools have only a slight edge, at under- and postgraduate level, in having been at Cambridge over those who were at state schools. But much larger differences arise with the two other comparisons. Privately schooled Fellows are over three times more likely to have attended Cambridge rather than London as undergraduates and five times more likely to have attended

Cambridge rather than any other university. At the postgraduate level, the odds ratio in the former case is clearly reduced, though far less so in the latter.

[Figure 3]

As well then as Fellows coming from higher professional and managerial, NS-SEC Class 1, backgrounds being over-represented among those attending Cambridge, so too are Fellows who were privately schooled. But, given that an association exists between class origins and type of secondary schooling, it is of evident interest to see how far class origin effects still show up in Fellows' university attendance once type of schooling is also taken into account.

In Table 5 we give results from two multinomial logit models showing the probabilities of Fellows having been undergraduates at Cambridge, Oxford, London or some other university by parental class and type of secondary schooling, with birth cohort being also included. Model 1 serves chiefly to confirm and to quantify more precisely what is already evident from Table 3 and Figure 2: i.e. that the association between Fellows' parental class and the universities they attended is rather systematic and in some instances remarkably strong. For example, the probability of Fellows of working-class origins having been to Cambridge is around 35 percentage points lower than that of Fellows from higher professional backgrounds, while the probability of the former of having gone to a university outside of the golden triangle of Cambridge, Oxford and London is some 31 percentage points higher than that of the latter.

When in Model 2 the secondary schooling variable is also introduced, the effects reported serve in turn to express more precisely what could be seen from Table 4 and Figure 3: i.e. that a systematic association also exists between Fellows' type of secondary schooling and the universities they attended. However, our focus is then on what happens to the effects of parental class. These effects are, as might be expected, generally reduced but they often

remain quite strong. For example, the probability of Fellows of working-class origins having attended Cambridge rather than any other university is still around 20 percentage points lower than this probability for Fellows of higher professional origins, while the probability of their having attended a university outside of the golden triangle is 16 percentage points higher. In other words, parental class has an association with university or type of university attended that is in some substantial degree independent of type of secondary schooling.

[Table 5]

In Table 6 we repeat the analyses of Table 5 for university attended at postgraduate level but including, in Model 3, undergraduate university as a further variable. Under this model, a strong probability is shown for those Fellows who were undergraduates at Cambridge, Oxford or London to have remained in these same universities as postgraduates, and for those who were undergraduates at other universities at least not to have moved on to Cambridge, Oxford or London. But it can also be seen that, despite this effect and that of type of secondary schooling, some non-negligible effects of parental class on postgraduate university are still present. In particular, notable differences show up in the probabilities of Fellows of higher professional and of working class origins having been postgraduates at Cambridge or, conversely, at universities outside of the golden triangle.

[Table 6]

What is therefore brought out by the foregoing analyses is that as regards Fellows' university attendance, and especially as regards being at Cambridge at the undergraduate and still at the postgraduate level, the influence of the 'long arm' of family of origin is readily apparent.

One further question arises. Are the effects of parental class and schooling in relation to Fellows' university careers simply additive or does some interaction occur such that the effect of schooling is greater or less depending on parental class. To address this question, concentrating now on the undergraduate level, we estimate probabilities of Fellows being at different universities from a model which includes a term for the interaction of parental class (collapsed to five categories) and schooling (private versus state) as well as terms for their main effects. The results are shown in Figure 4.

[Figure 4]

If no interaction were to occur then, for each university category, the differences in the probabilities of attendance as between Fellows privately and state educated should be the *same* across each of the parental classes that are distinguished. But, as can be seen, this is not the case. The differences vary, and some regularity is apparent in that they tend to be wider with Fellows coming from higher or lower managerial families than with those coming from higher or lower professional families. In particular, it can be seen that having been privately educated increases the probability of having been at Cambridge more for Fellows from managerial backgrounds than for those from professional backgrounds – while also reducing to a greater extent their probability of having been at a university outside of the golden triangle. And from Appendix Figure 2, it would appear that there is no great change in this situation across birth cohorts, apart from the fact that in the case of London the interaction effects in question are not present with Fellows born after 1950.

As said, in our previous paper (Bukodi, Goldthorpe and Steinberg, 2022) we have shown that Fellows originating within Classes 1 and 2 are far more likely to come from professional than from managerial families – this reflecting, it was suggested, differences in parental cultural,

including specifically educational and informational, resources. The present findings suggest that in the case of managerial parents, with perhaps cultural resources less relevant to supporting a child's scientific career, the use of their economic resources to provide private schooling may serve, if only unintentionally, as a means of compensation in developing their children's 'taste for science' – and especially then in regard to seeking entry to Cambridge.⁷ It may also be of relevance in this connection that, as was also earlier shown (Bukodi, Goldthorpe and Steinberg, 2022: Table 6), Fellows with managerial parents are more likely than those with professional parents to have attended private boarding rather than private day schools – that is, to have been exposed to greater school, relative to family, influence.

SOCIAL BACKGROUND, UNIVERSITIES AND FIELDS OF RESEARCH

A further finding of interest that we reported in our previous paper is that differences exist in the class origins of Fellows active in different fields of research – what the Royal Society classify as Subject Areas – and that these differences are only slightly modified when type of secondary schooling is also taken into account. We can now examine how far and in what ways Fellows' universities may be a further factor in this regard.

In Table 7, we show, first of all, results from a multinomial logit model of the probabilities of Fellows working in four different fields of research by different combinations of their

⁷ The phrase a 'taste of for science' comes from Galton (1874, p. 255), who saw the Scottish educational system as doing far more to develop such a taste than the English public schools of his day, in which, under the influence of the clergy, a hostility to science prevailed. However, in the second half of the twentieth century, leading private schools transformed their attitudes towards, and their teaching of, science and now generally provide facilities and staff-pupil ratios clearly superior to those found in state schools. See further Turner (2015).

undergraduate and postgraduate universities, with birth cohort also included. Some strong effects are apparent. Fellows who were at Cambridge as both undergraduates and postgraduates are far more likely than Fellows with any other combination of universities to work in mathematics and the physical sciences. Further, Fellows who were at Oxford as undergraduates and stayed on as postgraduates are more likely than others to be found in chemistry – as earlier observed, the one scientific field in which Oxford would claim a long-standing superiority over Cambridge – followed by Fellows whose university careers were made entirely outside the golden triangle. There is less differentiation by university in the case of biochemistry etc., but it is Fellows who attended London in combination with Cambridge or Oxford who have the highest probability of being found in the other biological sciences, while Fellows who remained at Cambridge appear those least likely to work in these fields.

[Table 7]

We next extend our modelling in order to see how far our earlier results on social background differences among Fellows in different research fields are affected when the universities they attended are also included in the analysis. In Table 8, we show under Model 1 what are essentially the same results as we previously reported (Bukodi, Goldthorpe and Steinberg, 2021, Table 9, Model 2), with field of research being related to parental class and also to type of schooling.⁸ In Model 2 the combinations of undergraduate and postgraduate universities from Table 7 are then introduced. What can be seen is that the effects of parental class and also of type of schooling differ very little from Model 1 to Model 2.

⁸ They differ slightly since in the present analysis Fellows who did not undertake postgraduate work (see n. 4 above) are excluded.

In other words, although differences in Fellows' university careers do appear to be quite strongly associated with their fields of research, the effects of parental class – as also of type of schooling – are in general rather little modified. And Appendix Table 1 shows that there is no great change in this finding across birth cohorts. The influence of the long arm of family of origin in particular is again suggested: that is, in regard to field of research as well as to university attended. With the data presently at our disposal, it is not possible for us, as we have previously recognised (Bukodi, Goldthorpe and Steinberg, 2022, p. 500), to investigate how this influence actually operates, but a focus for further investigation is clearly indicated.

[Table 8]

CLASS ORIGINS, EDUCATIONAL CAREERS AND THE SOCIAL COMPOSITION OF THE SCIENTIFIC ELITE

We have made detailed analyses of the associations existing between Fellows' class origins, schooling and universities and the further associations that exist with their fields of research. Focussing now on the Fellows in our target population as a whole, regardless of their subject areas, we wish to examine how differences in their class origins and in their educational careers from school to university find expression in the social composition of the scientific elite that they form.

To begin with, we consider differences among Fellows in their educational careers. If we treat type of secondary schooling as simply binary – private versus state – and for both undergraduate and postgraduate study take the same fourfold categorisation of universities as previously used – Cambridge, Oxford, London and others – we can distinguish $2 \times 4 \times 4 = 32$

kinds of educational career. In Table 9, we show the distribution of Fellows over these careers. What is immediately apparent is that the distribution is very uneven. This largely results from the tendencies earlier noted for Fellows who were undergraduates at Cambridge, Oxford or London to stay on as postgraduates at these same universities, and for those who were undergraduates at other universities outside of the golden triangle not to move on at least to Cambridge, Oxford or London as postgraduates. In fact, Fellows falling in cells on the university 'diagonals', taking those privately and state schooled together, account for 74% of all.⁹

The two most numerous cases are of particular interest. In the top left cell of Table 9 we have a grouping of Fellows, 14% of the total, who have taken what might be thought of as the privileged, 'royal road', into the scientific elite: that of private schooling leading on to both undergraduate and postgraduate study at Cambridge, the scientifically pre-eminent university. In contrast, though, in the bottom right cell we have a grouping of Fellows, as many as 20% of all, who went to state schools and then on to study at both undergraduate and postgraduate levels at a university or universities other than Cambridge, Oxford or London.¹⁰ It is, in other words, this latter, less privileged, educational route that is that most frequently taken into the scientific elite – although it has of course to be recognised that the Fellows following it come from a much larger base than do those who have followed the royal road.

⁹ As can be seen, the remaining cells, with one exception, are empty or contain only 1% of all Fellows. The exceptional case is the private schooling-Cambridge-London career. From our reading of the *Memoirs* of deceased Fellows, what, we believe, is chiefly reflected here is a tendency for privately schooled Cambridge graduates who wish to pursue medically related research to go on from Cambridge to do postgraduate work at one of the major London teaching hospitals.

¹⁰ As previously noted, the small number of women Fellows means that detailed analyses by gender are not possible. But as regards women's educational careers, Appendix Table 2 indicates that the most frequent was the same as with men: i.e. state schooling followed by attendance at universities outside of the golden triangle. The main way in which women's careers differ from men's is that, whether privately or state schooled, they were more likely to have been both under- and postgraduates at London rather than at either Cambridge or Oxford.

[Table 9]

How, then, are the different educational careers represented in the diagonal cells of Table 9 related to Fellows' class origins? In Table 10, we show results from a multinomial logit model that brings out the relevant probabilities, with birth cohort also being included. To maintain adequate numbers, NS-SEC classes 3 to 7 are collapsed.

First, it is evident that the probability of having followed the royal road into the scientific elite of private schooling and then a university education at Cambridge is highest for Fellows of higher professional and managerial origins, then lower for those of lower professional origins, and lower still for those of all other class origins. In contrast, the probability of having entered the elite via state schooling and university education outside of the golden triangle – the most common educational career of those in the elite – is lower for Fellows of higher professional origins *than for Fellows of all other class origins alike*. In other words, while higher professional families appear as the most important recruiting ground for members of the scientific elite, Fellows coming from such families show a marked tendency to have avoided the most common route of entry. That is, by having had private schooling leading on to Cambridge or to Oxford or London universities or by still gaining access to these universities after state schooling.

With the other educational careers of Fellows that figure in Table 10 – that is, where private schooling did not lead on to Cambridge, Oxford or London or where state schooling did lead on to these universities – differences in the probabilities of their having been followed by Fellows of different class origins are generally less marked. However, one schooling effect of interest may be noted that is in line with the results previously shown in Figure 4 (which related only to undergraduate university). Among Fellows privately schooled, there is little difference between those of higher professional and higher managerial origins in the probability of their

having had their entire university education at Cambridge – or at Oxford or London. But among Fellows who were state schooled, those of higher managerial origins have a clearly lower probability than those of higher professional origins of having been at Cambridge or Oxford, and are far more likely to have made their way into the scientific elite via other universities. This is then consistent with our earlier speculation that with Fellows whose family backgrounds were managerial rather than professional, private education may have played a compensatory role as regards the provision of cultural resources relevant to a scientific career.

Finally, the cohort effects reported in Table 10 should be noted. In general, these indicate rather little change over time. Those Fellows who started out from state schooling do show some tendency to have become more likely to go on to Oxford and less likely to London; but their main route into the elite, via universities outside of the golden triangle, seems of quite stable importance. And while some decline is apparent in the taking of the royal road as between the first and second cohorts, this is not maintained in the third.

[Table 10]

In sum, the composition of the UK scientific elite, while evidently socially structured in various ways, does at the same time show quite high variation, on a generally persisting pattern, in terms of the educational careers that its members have followed and in the association of these careers with their class origins.

CONCLUSIONS

In this paper, we have extended our earlier analyses of the social composition of the UK scientific elite, as represented by Fellows of the Royal Society born since 1900, so as to move

on from Fellows' class origins and schooling to take in also their university careers. In the light of our first paper, we were led to the conclusion that the study of elite formation and composition calls for more detailed and disaggregated treatment than has been the case in the past. The example of the scientific elite at least would suggest that elites can be more complex collectivities than would seem often to have been supposed. The analyses reported in this second paper were motivated by this conclusion and serve in turn to confirm it.

To begin with, we show that one university, Cambridge, is more important than any other, including Oxford, as a source of the scientific elite as we have defined it. In this connection, 'Oxbridge' is not then a very useful construction – and this may well prove to be the case with other elites too.¹¹

In turning to the associations that exist between Fellows' class origins and schooling and their universities, how a link with Cambridge arises is therefore of particular interest. What we find is that Fellows of NS-SEC Class 1, higher professional and managerial, origins are substantially over-represented among those who attended Cambridge as undergraduates and/or postgraduates – though not among those who attended Oxford – while Fellows of less advantaged class origins, apart from lower professional, are under-represented at Cambridge. Similarly, Fellows who were privately schooled are over-represented among those who went to Cambridge – far more so than among those who went to Oxford – while Fellows who were

¹¹ Most obviously, Oxford has often been regarded as a far more important source than Cambridge of the British political elite. Just how far this is the case we hope to establish in the course of a prosopographical study of this elite, defined as all members of Cabinets and Shadow Cabinets since 1945, that we are presently undertaking in collaboration with Professor Geoffrey Evans. Also of interest as regards the relevance of 'Oxbridge' will be the results of a further study we have under way of the British humanities and social sciences elite, as represented by all Fellows of the British Academy born since 1900.

state schooled are under-represented. However, further analysis indicates that even when type of schooling is taken into account, a strong association between attendance at Cambridge and parental class remains.

The influence of what we have called the long arm of family of origin is also evident in several other more specific ways. For example, Fellows from higher professional families that are also STEM families are somewhat more likely to have attended Cambridge than their non-STEM counterparts, while being clearly less likely than the latter to have gone to Oxford – suggesting differing parental awareness of Cambridge’s scientific standing. Again, we have shown – though we cannot with our present dataset seek to explain – that, controlling for university as well as for type of schooling, an association still exists between Fellows’ parental class and their fields of research. And one schooling effect for which we do find evidence – the relative importance as regards university access of private schooling for Fellows of managerial parentage – is best be understood, we have suggested, as compensating for a possible family cultural deficiency in relation to the making of a scientific career. In all of these respects, our earlier point is then reinforced that the frequent practice in elite studies of taking schooling as a proxy for information on social origins is likely to be inadequate and to some extent misleading.

Finally, we have considered the implications of our analyses of the associations existing among Fellows’ class origins, schooling and university careers for the social composition of the scientific elite that they represent. In our previous paper, we concluded that while this elite had once been more heterogeneous in terms of the class origins of its members than was the population at large, it had subsequently become less so. This mainly resulted from a growing proportion of Fellows coming from higher professional – and increasingly STEM – families at

the same time as the proportion coming from working class families fell sharply away. We also noted that there was little change over the birth cohorts we distinguish in the substantial proportion of Fellows – upwards of two-fifths – who were privately schooled. These conclusions still stand. However, bringing university careers into the analysis leads to a more complex picture of the social composition of the scientific elite.

Social skews are certainly evident in the over-representation among Fellows who had gained access to Cambridge of those from more advantaged class origins and of those who were privately schooled, and Fellows who in this way have followed what we have called the royal road into the scientific elite constitute a notable minority of its members. But at the same time, a larger proportion is made up of Fellows who entered the elite following state schooling and without the benefit of university careers at Cambridge – or at Oxford or London. And having followed this latter route is clearly more probable for Fellows of all other social origins alike than for those coming from higher professional families. In addition, there are other, non-negligible, routes into the elite that have been taken, in which private schooling did not lead on to Cambridge, or state schooling did lead on to universities within the golden triangle. And in these cases, associations with class origins are less marked. Finally, it is of some significance that in all of the foregoing respects there is little evidence of any sustained directional change over time – despite the expansion and the repeated reforms of both the secondary and tertiary educational systems over the historical period that our prosopography covers.

Our further analyses of the composition of the UK scientific elite do then serve to reinforce the point made in our previous paper that the relation between the degree of social closure or openness of an elite and the degree of social homogeneity or heterogeneity among its members can be far less straightforward than has often been supposed.

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TABLES & FIGURES

TABLE 1: Extent of coverage of target population of Fellows by birth cohort

	Birth cohort							All
	1900-09	1910-19	1920-29	1930-39	1940-49	1950-59	1960-	
Initial target population (N)	278	251	373	321	366	319	204	2112
% of missing information on								
undergraduate studies	0.4	0.0	0.3	0.6	0.5	0.3	1.0	0.4
postgraduate studies	0.4	0.4	1.6	0.9	0.5	0.3	1.0	0.7
type of secondary school	2.5	1.6	2.4	6.9	7.7	16.6	20.6	7.8
parental class	2.9	6.0	16.4	24.9	23.0	24.8	29.4	18.3
cummulative	5.0	7.2	18.5	26.5	24.9	27.6	32.4	20.4
Achieved target population								
N	264	233	304	236	275	231	138	1681
%	95.0	92.8	81.5	73.5	75.1	72.4	67.6	79.6

FIGURE 1: Distribution (%) of Fellows by university attended and birth cohort (Fellows having attended non-UK universities excluded)

Note

(a) In this and other purely descriptive Figures and Tables we include all individuals for whom we have relevant information. When multivariate modelling is involved, we include only those on whom we have complete information.

TABLE 2: Modified version of National Statistics Socio-Economic Classification (NS-SEC)

NS-SEC		Modified version and labelling used
1	Higher managers, large employers ^(a) and higher professionals	Higher professional ^(b) Higher managerial ^(b)
2	Lower managers, higher supervisors and lower professionals and higher technicians	Lower professional ^(b) Lower managerial ^(b)
3	Intermediate, clerical, etc. employees	Intermediate
5	Lower supervisors and technicians	
4	Small employers and own account workers	Self-employed
6	Semi-routine workers	Working class
7	Routine workers	

Note

(a) With more than 25 employees.

(b) We follow here the NS-SEC distinction between Class 1.2 and 1.1 and make a similar distinction within Class 2.

TABLE 3: Distribution (%) of Fellows by university attended and parental class (Fellows having attended non-UK universities excluded)

Parental class	Cambridge	Oxford	London	Other Russell Group	Rest	None	Total	N
Undergraduate								
Higher professional	45.1	18.5	15.9	15.9	4.6		100.0	459
STEM	46.7	15.3	14.9	16.5	6.7		100.0	255
Non-STEM	43.1	22.6	17.2	15.2	2.0		100.0	204
Higher managerial	45.5	14.8	15.3	19.9	4.6		100.0	176
Lower professional	34.1	15.7	14.8	24.9	10.6		100.0	217
Lower managerial	23.5	17.4	19.7	32.6	6.8		100.0	132
Intermediate	24.3	13.6	20.1	32.0	10.1		100.0	169
Self-employed	24.7	12.6	17.2	33.3	12.1		100.0	174
Working class	13.5	9.8	27.6	32.5	16.6		100.0	163
All	33.4	15.4	17.9	24.8	8.5		100.0	1490
Postgraduate								
Higher professional	37.0	15.9	22.8	14.0	3.2	7.2	100.0	473
STEM	39.4	14.1	21.9	15.2	4.1	5.2	100.0	269
Non-STEM	33.8	18.1	24.0	12.3	2.0	9.8	100.0	204
Higher managerial	35.0	14.5	21.0	16.7	3.8	9.1	100.0	186
Lower professional	33.0	17.7	18.1	19.9	6.3	5.0	100.0	221
Lower managerial	20.0	17.7	23.1	27.7	6.9	4.6	100.0	130
Intermediate	26.0	13.0	20.7	26.0	8.9	5.3	100.0	169
Self-employed	27.7	12.2	17.0	23.9	9.6	9.6	100.0	188
Working class	15.2	9.9	26.9	26.3	11.7	9.9	100.0	171
All	30.0	14.7	21.5	20.2	6.4	7.3	100.0	1538

FIGURE 2: Odds ratios of Fellows being graduates of Cambridge rather than of other universities, contrasting Fellows of NS-SEC Class 1 and NS-SEC Class 6 and 7 origins

TABLE 4: Distribution (%) of Fellows by university and type of secondary school attended (Fellows having attended non-UK universities excluded)

Type of secondary school	Cambridge	Oxford	London	Other Russell Group	Rest	None	Total	N
Undergraduate								
Private	47.7	19.9	13.4	15.0	4.0		100.0	702
Clarendon	61.5	23.1	10.8	3.9	0.8		100.0	130
Other, boarding	50.7	20.0	14.1	11.3	3.9		100.0	355
Other, day	34.6	18.0	13.8	27.7	6.0		100.0	217
State	21.6	11.8	21.0	33.9	11.7		100.0	972
Grammar/Comprehensive	23.3	12.6	20.3	32.4	11.4		100.0	863
Technical, central, etc.	8.3	5.5	26.6	45.0	14.7		100.0	109
Non-UK	21.1	7.9	34.2	18.4	18.4		100.0	38
All	32.3	15.1	18.2	25.8	8.7		100.0	1712
Postgraduate								
Private	37.0	17.9	20.7	12.3	3.4	8.7	100.0	676
Clarendon	34.5	16.8	26.9	5.9	3.4	12.6	100.0	119
Other, boarding	39.9	17.8	19.0	10.1	3.5	9.8	100.0	348
Other, day	33.5	18.7	20.1	19.6	3.4	4.8	100.0	209
State	21.6	11.7	21.6	28.9	9.6	6.6	100.0	949
Grammar/Comprehensive	22.0	12.6	21.8	27.5	9.6	6.5	100.0	841
Technical, central, etc.	18.5	4.6	20.4	39.8	9.3	7.4	100.0	108
Non-UK	43.1	15.4	21.5	11.5	3.9	4.6	100.0	130
All	29.1	14.4	21.3	21.2	6.8	7.3	100.0	1755

FIGURE 3: Odds ratios of Fellows being graduates of Cambridge rather than of other universities, contrasting Fellows having attended private schools with those having attended state schools

TABLE 5: Probabilities of Fellows having attended different universities as undergraduates by parental class, type of secondary school and birth cohort^(a), average marginal effects (%) from multinomial logit models

	Cambridge (32.3%)		Oxford (15.1%)		London (18.2%)		Other UK (34.5%)	
	M1	M2	M1	M2	M1	M2	M1	M2
Parental class								
Higher professional (ref.)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Higher managerial	-0.9	-0.9	-3.7	-3.6	-1.3	-1.2	6.1	6.1
Lower professional	-10.3	-2.0	-4.0	-1.8	-1.3	-1.3	15.6	7.2
Lower managerial	-21.0	-13.5	-2.4	-0.3	5.6	2.7	18.1	10.2
Intermediate	-20.5	-8.1	-5.1	-1.9	4.1	0.9	21.4	9.1
Self-employed	-20.2	-11.2	-5.2	-2.9	1.1	0.1	24.2	15.2
Working class	-34.7	-19.9	-6.7	-3.0	10.6	6.7	30.9	16.2
Type of secondary school								
Clarendon		34.5		12.1		-1.5		-46.5
Other private, boarding		20.7		6.0		-5.1		-22.6
Other private, day		10.2		2.9		-5.9		-6.2
State (ref.)		0.0		0.0		0.0		0.0
Cohort								
1900-29	-1.4	-0.9	-2.7	-2.5	2.2	2.3	1.8	1.1
1930-49 (ref.)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1950-	-5.6	-3.5	6.5	7.1	-7.2	-7.6	6.4	4.1

N=1442

Note

(a) Fellows having attended non-UK universities and non-UK secondary schools excluded.

TABLE 6: Probabilities of Fellows having attended different universities as postgraduates by parental class, type of secondary school, undergraduate university and birth cohort^(a), average marginal effects (%) from multinomial logit models

	Cambridge (30.7%)			Oxford (16.0%)			London (23.5%)			Other UK (29.8%)		
	M1	M2	M3	M1	M2	M3	M1	M2	M3	M1	M2	M3
Parental class												
Higher professional (ref.)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Higher managerial	-3.2	-3.2	-3.3	-1.3	-1.3	1.6	-2.0	-1.7	-0.3	6.5	6.5	1.4
Lower professional	-4.5	-0.1	1.6	2.2	1.9	2.3	-7.0	-6.1	-4.6	11.3	4.1	-1.3
Lower managerial	-16.8	-11.9	-3.7	-0.9	-0.1	1.2	-0.9	-0.3	-2.3	18.6	11.2	3.7
Intermediate	-11.3	-3.5	2.2	-4.1	-1.2	-0.2	-4.1	-3.9	-4.2	19.5	8.5	2.2
Self-employed	-11.2	-5.7	0.3	-2.4	-0.4	1.0	-8.6	-8.2	-6.5	22.2	14.3	3.3
Working class	-27.6	-18.8	-6.2	-5.4	-2.1	0.2	6.5	6.5	1.1	26.6	14.2	4.0
Type of secondary school												
Clarendon		12.4	-4.9		5.4	-0.7		9.5	9.6		-27.3	-4.0
Other private, boarding		16.4	4.5		6.4	1.9		-1.5	1.7		-21.4	-8.1
Other private, day		9.4	4.8		3.3	2.1		-2.5	-0.4		-10.2	-6.6
State (ref.)		0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0
Undergraduate university												
Cambridge (ref.)			0.0			0.0			0.0			0.0
Oxford			-31.5			25.4			1.1			4.0
London			-35.6			-1.5			32.1			4.9
Other UK			-32.4			0.3			-1.6			33.7
Cohort												
1900-29	3.3	3.3	4.1	-3.2	-3.1	-1.2	2.8	3.0	2.4	-2.9	-3.2	-5.3
1930-49 (ref.)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1950-	-3.9	-2.8	0.0	6.0	6.4	1.8	-1.6	-1.6	2.8	-0.5	-2.0	-4.5

N=1290

Note

(a) Fellows having attended non-UK universities and non-UK secondary schools excluded, also Fellows who did not study at postgraduate level.

FIGURE 4: Estimated probabilities (%) of Fellows having attended different universities as undergraduates by parental class and type of secondary school (private vs. state)^(a)

Note

(a) Based on a multinomial logit model that includes parental class, type of secondary school and interactions between these variables, with birth cohort as control.

TABLE 7: Probabilities of Fellows being found in four research fields by combinations of undergraduate and postgraduate universities, and birth cohort^(a), average marginal effects (%) from multinomial logit model

	Maths, Physical Sciences ^(b)	Chemistry	Biochemistry, etc. ^(c)	Other Biological Sciences ^(d)
Undergraduate–Postgraduate combination				
Cambridge – Cambridge (ref.)	0.0	0.0	0.0	0.0
Oxford – Oxford	-17.3	13.3	-4.7	8.6
London – London	-24.3	6.2	2.2	15.9
Other UK – Other UK	-17.3	9.4	0.4	6.6
Cambridge – Oxford, Oxford – Cambridge	-17.2	-1.2	0.1	18.6
Oxbridge – London, London – Oxbridge	-28.8	-1.1	-2.4	32.3
Oxbridge – Other UK, Other UK – Oxbridge	-5.8	5.9	0.2	1.3
London – Other UK, Other UK – London	-30.8	6.9	0.7	23.1
Cohort				
1900-29	3.1	3.1	-4.1	-2.2
1930-49 (ref.)	0.0	0.0	0.0	0.0
1950-	-0.2	-0.5	1.8	-1.1

N=1290

Notes

(a) Fellows having attended non-UK universities and non-UK secondary schools excluded, also Fellows who did not study at postgraduate level.

(b) Mathematics, computer science; Astronomy, physics; Engineering, technology; Earth sciences, environmental physical sciences

(c) Biochemistry, structural biology, molecular cell biology

(d) Developmental biology and genetics, immunology, microbiology; Anatomy, physiology, neuroscience; Organismal biology, evolutionary and ecological science; Health and human sciences

TABLE 8: Probabilities of Fellows being found in four research fields by parental class, type of secondary school, combinations of undergraduate and postgraduate universities, and birth cohort^(a), average marginal effects (%) from multinomial logit models

	Maths, Physical Sciences ^(b)		Chemistry		Biochemistry, etc. ^(c)		Other Biological Sciences ^(d)	
	M1	M2	M1	M2	M1	M2	M1	M2
Parental class								
Higher professional (ref.)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Higher managerial	-3.2	-3.0	5.5	5.5	1.0	0.8	-3.3	-3.3
Lower professional	4.9	3.9	1.9	1.1	0.9	0.8	-7.6	-5.8
Lower managerial	-0.3	1.8	2.6	1.1	1.2	0.8	-3.4	-3.7
Intermediate	0.7	1.9	3.8	3.1	4.5	4.3	-9.0	-9.0
Self-employed	1.0	1.6	7.4	6.9	1.6	1.2	-10.0	-8.7
Working class	6.5	6.7	7.0	6.6	6.3	5.6	-21.7	-21.7
Type of secondary school								
State (ref.)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Private	-3.9	-6.5	-3.0	-2.1	2.0	2.4	4.8	6.2
Undergraduate–Postgraduate combination								
Cambridge – Cambridge (ref.)		0.0		0.0		0.0		0.0
Oxford – Oxford		-18.3		12.9		-4.7		10.0
London – London		-27.7		5.1		1.7		21.0
Other UK – Other UK		-20.0		7.3		0.1		12.5
Cambridge – Oxford, Oxford – Cambridge		-16.7		-1.7		0.4		18.0
Oxbridge – London, London – Oxbridge		-29.2		-1.2		-2.5		33.0
Oxbridge – Other UK, Other UK – Oxbridge		-7.6		5.2		0.0		2.3
London – Other UK, Other UK – London		-34.2		5.7		0.4		28.0
Cohort								
1900-29	4.0	3.9	2.8	2.8	-3.8	-3.9	-3.0	-2.8
1930-49 (ref.)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1950-	-0.3	0.1	0.1	-0.1	2.2	2.4	-2.0	-2.4

N=1290

Notes

(a) (b) (c) (d) See Table 7.

TABLE 9: Secondary school, undergraduate university, postgraduate university careers (% of all)

Secondary school		Undergraduate university	Postgraduate university			
			Cambridge	Oxford	London	Other UK
Private		Cambridge	14	1	5	1
		Oxford	1	7	1	0
		London	0	0	5	1
		Other UK	2	1	0	6
State		Cambridge	9	1	1	1
		Oxford	1	5	1	0
		London	1	1	8	1
		Other UK	2	1	3	20

N=1290

TABLE 10: Probabilities of Fellows having followed eight secondary school and undergraduate and postgraduate university pathways by parental class and birth cohort, average marginal effects (%) from multinomial logit model

	Private schooling				State schooling			
	Cambridge	Oxford	London	Other	Cambridge	Oxford	London	Other
	↓ Cambridge	↓ Oxford	↓ London	↓ Other	↓ Cambridge	↓ Oxford	↓ London	↓ Other
Parental class								
Higher professional (ref.)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Higher managerial	1.2	-0.4	-0.4	-0.2	-9.4	-10.6	-1.7	22.0
Lower professional	-10.2	-7.3	-7.8	-0.1	3.4	4.2	1.7	20.2
Lower managerial	2.6	5.2	1.8	3.9	1.3	2.2	11.4	36.2
Other	-20.6	-7.4	-2.1	-3.7	0.6	3.9	5.6	36.9
Cohort								
1900-29	2.3	-1.0	-0.5	-1.4	-3.1	-1.1	2.3	0.0
1930-49 (ref.)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1950-	0.7	-0.8	-2.5	-1.0	-5.7	5.5	-3.4	0.7
N	187	80	60	63	111	68	108	250

APPENDICES

APPENDIX FIGURE 1: Distribution (%) of Fellows by university attended and birth cohort

APPENDIX FIGURE 2: Estimated probabilities (%) of Fellows having attended different universities as undergraduates by parental class and type of secondary school (private vs. state), separately by birth cohort^(a)

Note

(a) Based on a multinomial logit model that includes parental class, type of secondary school and interactions between these variables. Model run separately by birth cohort.

APPENDIX TABLE 1: Probabilities of Fellows being found in four research fields by parental class, type of secondary school and combinations of undergraduate and postgraduate universities, separately by birth cohort^(a), average marginal effects (%) from multinomial logit models

	Maths, Physical Sciences ^(b)			Chemistry			Biochemistry, etc. ^(c)			Other Biological Sciences ^(d)		
	1900-29	1930-49	1950-	1900-29	1930-49	1950-	1900-29	1930-49	1950-	1900-29	1930-49	1950-
Parental class												
Higher professional (ref.)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Higher managerial	0.2	-1.7	-6.5	6.3	3.9	7.9	-0.3	1.9	-1.2	-6.2	-4.1	-1.7
Lower professional	6.9	2.5	4.4	8.2	2.9	1.9	-4.6	-0.8	6.3	-10.5	-1.2	-7.7
Lower managerial	-4.4	3.6	4.6	3.8	1.0	2.1	-1.8	1.2	3.0	-2.3	-3.8	-9.7
Other	7.0	6.1	7.6	3.1	7.0	8.5	1.1	4.1	9.8	-12.2	-14.3	-10.8
Type of secondary school												
State (ref.)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Private	-10.2	-8.8	-3.8	-5.1	-2.6	-3.3	2.0	2.9	1.6	13.3	4.3	6.5
Undergraduate - Postgraduate combination												
Cambridge – Cambridge (ref.)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Oxford – Oxford	-18.4	-11.9	-31.7	11.3	14.9	12.4	-5.2	-5.2	-1.7	12.2	5.3	18.1
London/Other UK – London/Other UK	-23.1	-15.2	-39.2	6.3	7.4	3.6	1.1	3.8	10.4	15.7	11.6	24.2
Any other combination	-17.0	-20.6	-32.6	1.0	7.3	1.1	-2.1	-2.6	6.8	19.1	17.9	24.7

Notes

(a) (b) (c) (d) See Table 7.

APPENDIX TABLE 2: Secondary school, undergraduate university, postgraduate university careers by gender (% of all)

Men					
Secondary school	→ Undergraduate →	Postgraduate			
		Cambridge	Oxford	London	Other UK
Private	Cambridge	16	1	5	1
	Oxford	1	6	1	0
	London	0	0	4	1
	Other UK	2	1	1	5
State	Cambridge	9	1	2	1
	Oxford	1	5	1	0
	London	1	0	8	1
	Other UK	3	1	3	20

Women					
Secondary school	→ Undergraduate →	Postgraduate			
		Cambridge	Oxford	London	Other UK
Private	Cambridge	8	0	1	1
	Oxford	0	5	1	3
	London	0	0	11	0
	Other UK	2	0	4	6
State	Cambridge	5	2	0	1
	Oxford	2	9	1	2
	London	2	2	10	2
	Other UK	2	0	5	13