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Teodora
Boneva
University of
Zurich

Marta
Golin
University of
Oxford

Christopher
Rauh
University of
Cambridge

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Can Perceived Returns Explain Enrollment Gaps in Postgraduate Education?

TEODORA BONEVA, MARTA GOLIN AND CHRISTOPHER RAUH*

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To understand students' motives in obtaining postgraduate qualifications, we elicit intentions to pursue postgraduate education and beliefs about its returns in a sample of 1,002 university students. We find large gaps in perceptions about the immediate and later-life benefits of postgraduate education, both between first- and continuing-generation students and within the latter group. Differences in student beliefs about returns can account for 70% of the socioeconomic gaps in intentions to pursue postgraduate studies. We document large differences in students' current undergraduate experiences by socioeconomic background and find these to be predictive of perceived returns to postgraduate education.

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* Boneva: University of Zurich (teodora.boneva@econ.uzh.ch). Golin: University of Oxford (marta.golin@economics.ox.ac.uk). Rauh: University of Cambridge (cr542@cam.ac.uk). We thank seminar participants at the University of Montreal and the Tinbergen Institute Amsterdam as well as participants of the EALE/SOLE/AASLE Conference, the briq Workshop on Beliefs, the Warwick Applied Workshop, the Berlin Workshop on Expectations and Decisions and the HCEO SSSI for helpful comments and suggestions. Boneva acknowledges support from the Jacobs Foundation. Golin acknowledges support from the ESRC. Rauh acknowledges support from the SSHRC. Part of this research was conducted during Boneva's visit at the CIREQ Montreal. This study has been approved by the Department's Research Ethics Committee (DREC) at the University of Oxford (Project ID number: ECONCIA18-19-13).

1. Introduction

In many countries, including the US and the UK, intergenerational mobility is low (Blanden et al. 2001; Blanden, Gregg and Macmillan 2007; Chetty et al. 2014*a,b*). At the same time, wage inequality has been increasing rapidly, especially at the upper tail of the wage distribution (Lemieux 2006; Autor, Katz and Kearney 2008; Machin 2011). These increases at the upper tail of the wage distribution have been linked to skill-biased technological change (e.g. Autor, Katz and Krueger 1998; Krusell et al. 2000; Acemoglu 2002*a,b*), which has led to a steadily rising college-earnings premium.¹ Traditionally, studies examining college earnings premia and skill-biased technological change have focused on differences between college-educated workers and workers without a college degree.² More recently, attention has been drawn to the rising wage inequality *within* the group of college-educated workers and the role of postgraduate education in explaining this pattern (Eckstein and Nagypal 2004; Lindley and Machin 2016; Altonji and Zhong 2021).

In recent decades, an increasing share of first-degree holders also obtain postgraduate qualifications. At the same time, earnings growth for postgraduate-degree holders has been much steeper than for workers who only hold a first degree.³ Postgraduate-degree holders now comprise a significant share of the workforce. As of 2018, in the US and the UK, around 15% and 14% of employees have postgraduate qualifications (or around 37% of employed first-degree holders in both countries).⁴ They earn significantly more than employees who only have a first degree (see Appendix Figure A.1) and they are over-represented in the upper tail of the earnings distribution. Given the rising levels of wage inequality and the high intergenerational persistence in earnings, this raises the question of who invests in postgraduate

¹See Mincer (1996); Deschênes (2001); Katz and Murphy (1992); Card and Lemieux (2001); Autor, Katz and Kearney (2008); Goldin and Katz (2009); Carneiro and Lee (2011); Acemoglu and Autor (2010).

²Similarly, the literature estimating the elasticity between workers of different skill levels (e.g., Dustmann, Ludsteck and Schönberg 2009; Ciccone and Peri 2005) generally focuses on college vs non-college workers, thereby ignoring the difference within college graduates.

³This pattern has been documented by several different studies, e.g. Eckstein and Nagypal (2004); Autor, Katz and Kearney (2008); Acemoglu and Autor (2010); Lindley and Machin (2016). See Altonji, Arcidiacono and Maurel (2016) for an overview of this literature, detailed enrollment statistics, and returns to graduate degrees in the US.

⁴See Appendix A for a description of the data.

education and what drives individual decisions to obtain a postgraduate degree. Despite the fact that postgraduate-degree holders are the most educated and most highly-skilled group in the population (Lindley and Machin 2016), surprisingly little is known about what drives this educational choice.

In this paper, we aim to fill this gap in the literature and shed light on students' motives to obtain postgraduate education. In order to do so we proceed in three steps. First, we survey a representative sample of 1,002 undergraduate students in England and elicit beliefs about the returns to postgraduate education as well as intentions to enroll in a postgraduate degree. This unique dataset allows us to document individual heterogeneity in perceptions about different immediate and later-life benefits and costs of postgraduate education as well as investigate whether beliefs differ with the socioeconomic background of the respondent. Second, we estimate a choice model in which we allow for differences in beliefs and preferences across socioeconomic groups and examine whether differences in beliefs about returns can account for the socioeconomic gap in students' intentions to pursue postgraduate education. Finally, we investigate whether students with different socioeconomic backgrounds differ in their undergraduate experiences, and examine whether these experiences predict their perceptions about the immediate benefits and costs of continuing to postgraduate education.

We elicit individual beliefs about the returns to postgraduate education using hypothetical investments scenarios. This allows us to overcome the problem that educational choices are consistent with many different combinations of preferences and beliefs (Manski 2004). More specifically, we ask students to imagine scenarios in which they enroll or do not enroll in postgraduate education. We then elicit their perceptions about a range of different immediate and later-life outcomes that are of pecuniary and non-pecuniary nature. To get a better sense of how students experience studying towards their undergraduate degrees, we administer a novel questionnaire designed to capture students' actual experiences.

Several results emerge from our study. First, undergraduate students who are the first generation in their family to go to university state a 5 percentage point lower likelihood of continuing to postgraduate education relative to continuing-generation students. First-generation students in our sample also perceive a range of different benefits of postgraduate

education to be lower. This is especially true for the immediate benefits associated with attendance. Second, the estimates of our choice model and results of our decomposition analysis reveal that around 70% of the first-generation vs. continuing-generation gap in students' intentions to enroll in a postgraduate degree can be accounted for by differences in beliefs about returns. We also find striking differences *within* the group of continuing-generation students. Students who have at least one parent with a postgraduate degree state, on average, an 8 percentage point higher likelihood of enrolling in a postgraduate degree relative to students who have at least one parent with a first degree, but no parent with a postgraduate degree. Again, differences in beliefs can explain a sizeable share of this gap.

Our last set of results relate to students' actual university experiences. We document that there are sizeable socioeconomic gaps in how students experience their undergraduate life, how they finance their studies, and how they allocate their time across different activities. In particular, first-generation students are significantly less likely to enjoy their coursework or have received parental support in their choice of attending university, and are more likely to struggle financially and work alongside their studies. Finally, students' current experiences are predictive of beliefs about the immediate non-pecuniary benefits of postgraduate education, which is consistent with a theory in which current experiences shape beliefs about likely future experiences.

A question which emerges is whether there are actual gaps in the returns to postgraduate education by students' socioeconomic background. Given the socioeconomic differences we find in terms of how students experience their lives as undergraduates, it may very well be that there are also gaps in the returns to postgraduate education, especially when it comes to the immediate non-pecuniary factors. Similarly, the returns to postgraduate degrees in terms of labor market outcomes may also vary with the students' socioeconomic background. We provide suggestive evidence on differences in earnings premia by parental education.

Our study builds on and contributes to several strands of the literature. First, it contributes to the large and growing literature on the role of beliefs in decision-making. The role of beliefs has been studied in many different contexts.⁵ Our study most closely relates to the work that

⁵For example, Kaufmann and Pistaferri (2009) and Armantier et al. (2015) show that individual

examines the role of beliefs in students' decisions to obtain further schooling (e.g., Dominitz and Manski 1996; Jensen 2010; Attanasio and Kaufmann 2014; Kaufmann 2014; Almas et al. 2016; Attanasio and Kaufmann 2017; Boneva and Rauh 2019; Belfield et al. 2019). To the best of our knowledge, we are the first to investigate the role of beliefs in students' decisions to obtain postgraduate education.

Second, our study relates to the role of students' beliefs in their choice of major, high school track and occupation, or which specific university to attend (e.g., Arcidiacono, Hotz and Kang 2012; Zafar 2012, 2013; Wiswall and Zafar 2015; Hastings et al. 2016; Giustinelli 2016; Hastings, Neilson and Zimmerman 2017; Giustinelli and Pavoni 2017; Giustinelli and Manski 2018; Wiswall and Zafar 2018; Delavande and Zafar 2019; Arcidiacono et al. 2020). Similar to many of the studies in this literature, we find that non-pecuniary factors, including considerations related to family dynamics (e.g., parental approval), play a major role in the decision to obtain postgraduate education. In contrast to these studies, we examine an extensive rather than an intensive margin choice.

Third, we contribute to the literature on the importance of personal experience in belief formation. While other studies have shown that personal experiences can shape beliefs in other domains (e.g., Malmendier and Nagel 2011; Hyll and Schneider 2013; Giuliano and Spilimbergo 2013; Malmendier and Nagel 2016; Laudenbach, Malmendier and Niessen-Ruenzi 2019, 2020), we show that personal experiences are also predictive of beliefs in an educational context. Shedding light on the relationship between experiences and beliefs is crucial for our understanding of how beliefs are formed.

Finally, we contribute to the literature on postgraduate education which has examined postgraduate earnings premia and other benefits of postgraduate education (Eckstein and Nagypal 2004; Lindley and Machin 2016; Gu 2019). Altonji and Zhong (2021) estimate the returns to a broad set of graduate degrees in the US. Relatedly, a number of studies have investigated the returns to specialized postgraduate programs such as MBAs (Graddy and Pistaferri 2000; Arcidiacono, Cooley and Hussey 2008; Bertrand, Goldin and Katz 2010) and medical degrees (Bhattacharya 2005; Chen and Chevalier 2012; Ketel et al. 2016). While beliefs are important for consumption decisions and financial investment decisions, respectively.

these studies examine the benefits of postgraduate education, we contribute to this literature by examining students' motives for obtaining it.

2. Survey Design

To study students' perceptions about postgraduate education and their current experience at university, we design and administer a survey to a large representative sample of undergraduate students in England. We survey students prospectively rather than retrospectively to minimize potential biases that could arise from ex-post rationalization. Section 2.1 describes how we elicit students' intentions to enroll in a postgraduate degree as well as students' beliefs about their likely future performance. Section 2.2 describes the hypothetical scenarios we use to elicit individual beliefs about different immediate and later-life returns to postgraduate education, while Section 2.3 presents the survey module we design to measure students' current experiences at university. The questionnaire can be found in Appendix B.

2.1. Students' Intentions to Obtain Postgraduate Education

To elicit students' intentions to obtain postgraduate education, we ask students to state how likely they think it is that they will enroll in a postgraduate degree if they obtain the necessary grades. We use clickable sliders to elicit students' beliefs about probabilities on a 0-100% scale. The use of clickable sliders is preferable over the use of open-ended questions as clickable sliders have been shown to minimize rounding (see, e.g., de Bruin and Carman 2018).⁶ We chose to ask students to state their intentions on a probabilistic scale because it allows individuals to express uncertainty about their decisions. Previous work investigating students' intentions to obtain university education has shown that students' self-reported intentions to pursue further education correlate strongly with their actual application decisions (Boneva and Rauh 2019). The study further documents that the test-retest correlation of this survey measure is high and does not vary with socioeconomic background.

In addition to beliefs about the likelihood of enrolling in postgraduate education, we elicit

⁶These questions are preceded by an example question that illustrates the use of the probabilistic scale.

students' beliefs about the likelihood that they will obtain the necessary qualifications to enroll in a postgraduate degree. More specifically, we ask respondents to state how likely they think it is that they will complete their undergraduate degree and how likely they think it is that they will obtain First-class honors conditional on completing it. We also elicit individual beliefs about the likelihood of graduating conditional on enrolling in a postgraduate degree. This allows us to document whether students from different socioeconomic backgrounds differ in terms of their perceptions of whether they can succeed in obtaining the postgraduate degree of their choice. While the focus of this paper is not on understanding what may be driving students' beliefs about their own performance, we use this information to perform robustness checks in which we limit the analysis to only those students for whom postgraduate degree enrollment is a realistic option.

Finally, while we do not model subject choice in this paper, we also ask students to state which subject they would choose if they were to enroll in a postgraduate degree. When we ask students to imagine their lives in the hypothetical scenario in which they enroll in a postgraduate degree, we explicitly clarify that they should think about enrolling in their subject of choice.

2.2. *Beliefs about Returns to Postgraduate Education*

To elicit student beliefs about the pecuniary and non-pecuniary returns to postgraduate education, we ask students about (the likelihood of) potential outcomes (i) if the student continues to postgraduate education and (ii) if the student does not continue to postgraduate education but starts working instead.⁷ For each of these two different scenarios, students are asked about a range of different outcomes, which are summarized in Panel A of Table 1. We group the outcomes into two categories, namely, *immediate outcomes* that are realized during the 1-2 years during which the student may or may not be enrolled in postgraduate education and *later-life outcomes* that are realized when the student has entered the labor market. For the latter, we ask students about potential outcomes at age 35, when most individuals will

⁷We explicitly ask students to think that the alternative is to start working because we did not want students to think about the possibility of doing a gap year before continuing into postgraduate education.

have completed their education and will have entered the labor market.

To elicit beliefs about immediate outcomes, we ask students to think about what their lives are likely to be like during the 1-2 years after completing their undergraduate degree. We use probabilistic questions to elicit their perceptions about the occurrence of different binary outcomes (see Manski 2004 for a review of this methodology). More specifically, we ask students how likely they think it is that they will enjoy their social life, enjoy their study/work, feel stressed, struggle financially, and have enough money to do what they enjoy depending on whether or not they are enrolled in a postgraduate degree. We also ask them about their expected earnings if they started to work as well as the amount they would have to pay in tuition fees if they enrolled in a postgraduate degree, and the probability of having to work alongside their studies if enrolled in a postgraduate degree.

For outcomes at age 35, we ask students what their likely earnings will be (conditional on working full-time) and how likely they think it is that they will be working full-time, depending on whether their highest level of education is a postgraduate degree or an undergraduate degree. For each of the two scenarios, we also elicit subjective probabilities about career satisfaction, having a high status in society, and contributing to society, as well as individual perceptions about the likelihood of having a good work-life balance, and having children.⁸ While the perceived variance of earnings within certain scenarios conditional on full-time work could be useful information, we do not elicit this information to keep the survey compact. We do, however, capture important sources of uncertainty by allowing for differences in beliefs about the probability of completing postgraduate education and finding a full-time job.

⁸As is common in the subjective expectations literature, we elicit subjective expectations about later-life outcomes at just one point in time (i.e., at age 35) rather than for all future time periods, as the inclusion of more time periods would have led to a substantial increase in the number of questions, increasing the burden on respondents rather substantially and potentially compromising the quality of the answers. Studying beliefs about earnings growth and retirement savings in the different scenarios is an interesting potential avenue for future research.

Table 1—: Overview of belief elicitation and university experience questions

<i>Panel A: Belief elicitation questions</i>	
<i>Scenarios</i>	<i>Outcomes</i>
	<i>Immediate outcomes</i>
(1) If you enrol in your preferred postgr. degree	Enjoy social life (0-100%)
(2) If you start working	Enjoy study/work (0-100%)
	Feel stressed (0-100%)
	Struggle financially (0-100%)
	Have parental support in your choice (0-100%)
	Exp. tuition fees + foregone earnings
	<i>Later-life outcomes</i>
Highest qualification is:	Earnings (conditional on working full-time)
(1) postgraduate degree	Work full time (0-100%)
(2) undergraduate degree	Be satisfied with professional career (0-100%)
	Have a high status in society (0-100%)
	Contribute to society (0-100%)
	Have good work-life balance (0-100%)
	Have children (0-100%)
<i>Panel B: University experience questions</i>	
<i>Category</i>	<i>Questions</i>
Social life	Enjoy social life and activities (0-100)
	Meet people with whom I get along (0-100)
	Have little contact with family / friends from school (0-100)
	Feel lonely and not part of a group (0-100)
Course material	Enjoy studying for my course (0-100)
	Find the material covered in my course interesting (0-100)
Stress	Find the material too hard / workload too high (0-100)
	Feel stressed (0-100)
Financial situation	Struggle financially (0-100)
	Have enough money to do what I enjoy (0-100)
Parental support	Parental support in decision to go to university (0-100)
Life better than expected	Life at university is better than expected (0-100)

Notes: In the belief elicitation module, students are asked about potential immediate outcomes occurring during the 1-2 years after completing their undergraduate degree as well as potential later-life outcomes relating to their lives at age 35. The university experience questions instead refer to students' current life as undergraduate students.

2.3. Student Experiences, Time Allocation, and Finances

University students may vary in how they experience studying towards their undergraduate degree. To understand whether there are systematic differences across socioeconomic groups and to investigate whether perceived current experiences are associated with students' beliefs about the benefits and costs of postgraduate education, we present students with twelve

statements and ask them to rate to what extent these statements apply to them on a 0-100 scale. The twelve statements are summarized in Panel B of Table 1 and relate to students' social lives, coursework, financial situation, and the parental support they received in their decision to attend university. We further ask students the extent to which they agree with the statement that life at university is better than expected.

To obtain a clearer picture of how the lives of students differ, we elicit information on how students allocate their time across different activities and we collect information on students' finances. More specifically, we ask students how many hours they spent on (i) attending lectures, seminars or tutorials, (ii) studying or preparing for lectures and exams, (iii) participating in student societies, (iv) socializing with friends, (v) working for pay, and (vi) working without pay in the previous week. We also ask students about the work they do alongside their studies and the work they did during the last summer break. We further collect information on how much they pay in tuition fees (per year), how they finance their studies, and how much they spend in a typical month during term time.

3. Data

To examine how students perceive the benefits and costs of postgraduate education and to study which motives are important in students' decisions to obtain a postgraduate degree, we collect primary survey data on a large representative sample of undergraduate students in England. The data were collected by a professional survey company in the fall semester of 2018.⁹ The sample consists of 1,002 university students between the ages of 18-27 who, at the time of the survey, were enrolled in a full-time undergraduate course. The sample was selected to be representative of the distribution of the undergraduate student population across all regions of England and, within each region, quota-based sampling was implemented to ensure an equal representation of first- and continuing-generation students. Throughout the text, we refer to the former group as students from low socioeconomic status, and to the

⁹All participants were part of the company's online panel and participated in the survey online. The survey was scripted in the online survey software Qualtrics. Respondents on the platform receive modest incentives for completing any given survey, and their payments are roughly equivalent to the hourly minimum wage if they participate in surveys for one hour.

latter group as students from high socioeconomic status. This sampling procedure affords us sufficient power to detect differences between the different socioeconomic groups. For each region and socioeconomic group, we sampled an equal number of male and female students. Table C.1 in the Appendix shows the distribution of respondents across regions and the comparison to the national distribution of university students across regions in England. As can be seen from the table, the two distributions are very similar.

Table C.2 shows the characteristics of our sample. By construction, 50% of the undergraduate students in our sample are first-generation students and 50% are women. 16% of all respondents report that they have at least one parent who has obtained a postgraduate degree. On average, participants are 20 years old and in the second year of their undergraduate course. They are enrolled at 114 different universities across England.¹⁰ 39% of the undergraduate students in our sample attend a university that is part of the Russell Group, which is an association of 24 universities in the UK that are considered as leading in research and teaching. 14% of the students in our sample report that they attended a private school before starting university. Unlike state schools, private schools are fee-charging institutions.¹¹ 18% of all students in our sample report that they study in their home town.

There are noteworthy differences across socioeconomic groups. While 47% of continuing-generation students attend a university that is part of the Russell Group, the corresponding number for first-generation students is 31% (p -value < 0.001). Within the continuing-generation group, 52% of those whose parents have a postgraduate degree attend a Russell Group university, compared to 44% of those whose parents only have an undergraduate degree (p -value = 0.0732). Similarly, 23% of continuing-generation students attended a private secondary school, while this figure is only 5% for first-generation students (p -value < 0.001). Within the continuing-generation group, 30% of those whose parents have a postgraduate

¹⁰5% of the students in our sample either did not provide us with information on the university they attend or provided the name of an institution outside England. Our results are robust to dropping those individuals from the analysis.

¹¹In the UK, these schools are referred to as public/independent schools. As a comparison, in the academic year 2017-2018, 91% of all UK-domiciled full-time undergraduate students enrolled in higher education had attended a state-funded school, while 28% of all full-time undergraduate students attended a university that is part of the Russell Group.

degree attended a private school, against 20% of those whose parents only have an undergraduate degree (p -value = 0.0069).

We also ask students to indicate which subject field they are currently studying. Table C.3 in the Appendix shows the distribution of individuals across different subject fields for the whole sample, and separately for first- and continuing-generation students as well as male and female students. Interestingly, there is no significant difference in the distribution of students across subject fields by socioeconomic status (p -value for Pearson’s test of equality of distribution=0.656). At the same time, consistent with other studies documenting that men and women sort into different majors and subject fields (Wiswall and Zafar 2018), we find a significant difference in the distribution of female and male students across subject groups (p -value < 0.001). When asked about which subject field they would choose if they were to continue to postgraduate education, 83% of the students in our sample report they would continue to a degree in the same subject field.

4. Student Beliefs and Experiences

4.1. Gaps in Students’ Intentions to Obtain Postgraduate Education

We start by documenting differences in students’ intentions to enroll in postgraduate education.¹² As explained in Section 2, we ask students to state how likely they think it is they would enroll in a postgraduate degree if they obtained the necessary grades. Panel A in Figure 1 shows the distribution of responses, separately for first-generation students (dashed line) and continuing-generation students (solid line). There are several patterns worth noting. First, there is a large amount of heterogeneity in individual responses within both of these groups. While some students seem to be very certain that they would like to pursue a postgraduate degree, other students are unsure about it or almost certain they do

¹²Appendix Figure C.1 depicts the histogram of individual beliefs about the likelihood of enrolling in a postgraduate degree for the full sample. We note that while there is some evidence of rounding at multiples of 5 and 10, a significant share of respondents also choose values in-between. Importantly, we find no significant differences in the share of respondents answering in multiples of 5 (p -value = 0.138), in multiples of 10 (p -value = 0.381) or stating a probability of enrolling in a postgraduate degree equal to 0, 50 or 100 (p -value = 0.922) between first- and continuing-generation students.

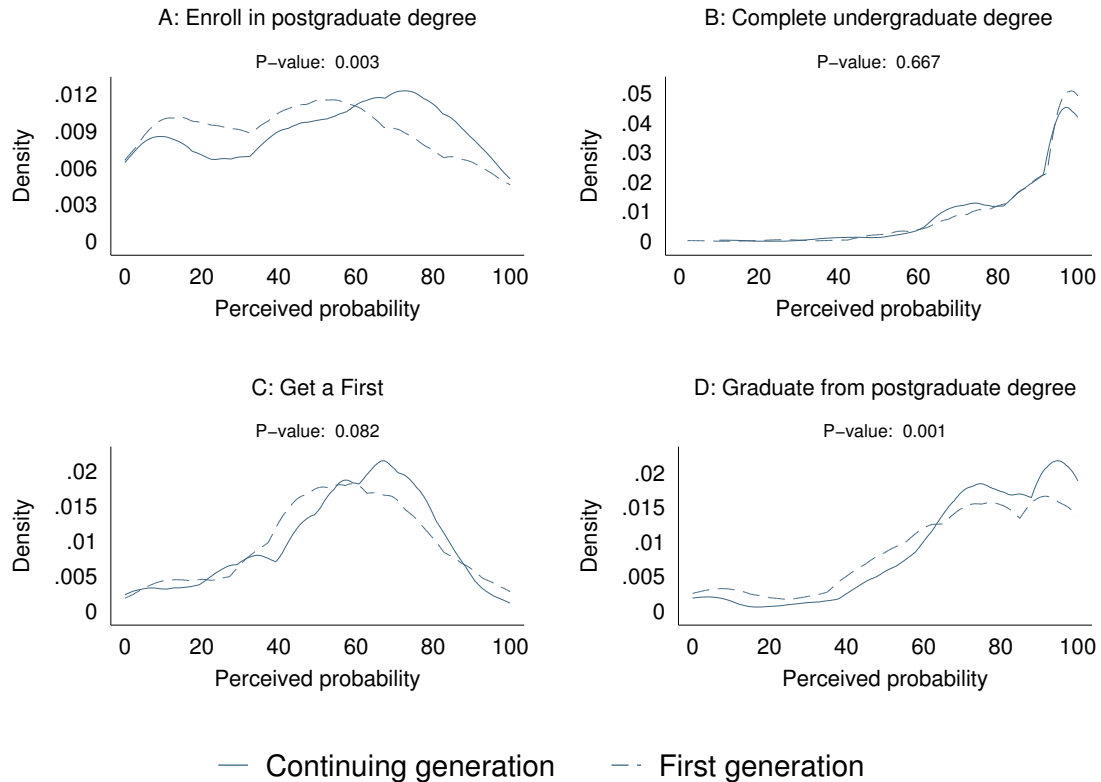
not wish to enroll in one. Second, there are significant differences across the two groups, with continuing-generation students stating significantly higher likelihoods of continuing to postgraduate education.¹³ As can be seen in Panel A of Table 2, the mean stated likelihood for first-generation students is 47%, while it is 52% for continuing generation students (p -value=0.013). This gap in intentions to enroll cannot be explained by differences in the subjects students study or the universities they currently attend. When we control for subject and university fixed effects, as well as other observable characteristics such as gender and age, we estimate a conditional gap of 4.73 percentage points in students' intentions to enroll, which is remarkably similar to the unconditional gap (see Table 2 column 6, Panel A). Our results are consistent with findings from Wakeling and Hampden-Thompson (2013), who document a 4 percentage point gap in actual progression rates to postgraduate degrees between students whose parents do and do not have higher qualifications.¹⁴ In addition to eliciting students' beliefs about how likely they are to enroll in a postgraduate degree if they get the grades, we elicit students' perceptions about the likelihood they will complete their undergraduate degree, the probability they will obtain First-class honors if they graduate, and the likelihood they will graduate if they enroll in a postgraduate degree. When we compare the responses of first- and continuing-generation students, we find no significant differences in students' average beliefs regarding the likelihood they will complete their undergraduate degree or graduate with First-class honors (see Panel A of Table 2). We do, however, find that first-generation students perceive the likelihood of graduating from a postgraduate degree to be about 6 percentage points lower (p -value < 0.001). In Panels B-D of Figure 1, we depict the distributions of individual responses to these three questions, separately for first- and continuing-generation students.

The distinction between first- and continuing-generation students is arguably a relevant one and captures important differences in terms of socioeconomic background. At the same time, it masks an additional source of potentially relevant heterogeneity: 33% of the parents

¹³The Kolmogorov-Smirnov test of equality of distributions rejects the null hypothesis that the two distributions are the same at the 1% level.

¹⁴Figures from Wakeling and Hampden-Thompson (2013) refer to immediate progression to taught postgraduate degrees of full-time UK- and EU-domiciled first-degree graduates who successfully completed their studies in the 2009-2010 and 2010-2011 academic years.

Figure 1. : Differences in beliefs by parental education



Notes: The different panels depict the kernel densities of individual beliefs about the likelihood of enrolling in a postgraduate degree (Panel A), graduating with an undergraduate degree (Panel B), getting a First in their undergraduate degree (Panel C), and graduating with a postgraduate degree (Panel D). The densities are depicted for first-generation students (dashed line) and continuing-generation students (solid line), respectively. Reported p-values are from Kolmogorov-Smirnov tests of equality of distributions.

of continuing-generation students also have postgraduate qualifications. Given the focus of this paper, we also study whether continuing-generation students who have at least one parent with a postgraduate degree have different beliefs compared to continuing-generation students whose parents do not have postgraduate qualifications (see Panel B of Table 2 and Figure C.2). The differences across these two groups are striking. Students whose parents hold a postgraduate qualification report a 8.2 percentage point higher probability of enrolling in a postgraduate degree, compared to continuing-generation students whose

parents only have an undergraduate degree. Again, we find that this gap cannot be explained by differences in subject choice or the university students attend. The conditional gap we estimate is in fact somewhat larger than the unconditional gap (9.9 percentage points). Regarding perceived performance, we find some differences in students' perceptions about the probability of completing their undergraduate degree but no differences in beliefs regarding the probability of obtaining First-class honors or completing a postgraduate degree. Once we control for individual characteristics as well as subject and university fixed effects, we find no significant differences in any of the three perceived performance measures. While numerous studies have investigated the persistence of university education across generations, these results point to an additional channel that has received little attention in the literature: the intergenerational persistence of postgraduate education.

Given the educational context we study, we further investigate whether continuing-generation students who attended a private secondary school report higher intentions to enroll in a postgraduate degree compared to continuing-generation students who attended a state school.¹⁵ Remarkably, we find no significant differences across the two groups, neither in terms of intentions to enroll in a postgraduate degree nor in terms of the three perceived performance measures we elicit (see Table C.4 in Appendix C). These results are surprising in light of the fact that students educated in private schools have a much more privileged background. As we will see in Section 6.1, students from private schools are significantly less likely to struggle financially, and yet they are no more likely to want to continue with their education. This pattern highlights the importance of factors unrelated to financial standing in their choice.

Before we turn to socioeconomic differences in beliefs about the benefits and costs of postgraduate education, we comment briefly on how students' average beliefs reported in this section compare to actual statistics on enrollment and performance. On average, students state a 49% likelihood of enrolling in a postgraduate degree if they get the grades (Table 2).

Using data from the Labour Force Survey (LFS), we document that 37% of employed first-degree holders also have a postgraduate degree. Given that continuation rates increase over

¹⁵Only 25 first-generation students in our sample attended a private school. For all analyses by school type we restrict the sample to continuing-generation students only.

Table 2—: Differences in beliefs by parental education

<i>Panel A: Full sample</i>						
	All	Parental background				Cond. gap
Belief		First	Continuing	Diff	P-value	
Enroll post-gr. degree	49.380 [29.969]	47.016 [29.573]	51.739 [30.204]	-4.723 (1.890)	0.013	-4.727** (2.183)
Complete undergrad. degree	88.670 [14.667]	89.216 [14.537]	88.124 [14.790]	1.092 (0.927)	0.239	0.188 (1.044)
Get a First	56.076 [21.772]	55.461 [22.044]	56.691 [21.502]	-1.230 (1.376)	0.372	-1.241 (1.578)
Graduate (post-gr.)	73.602 [24.549]	70.611 [26.162]	76.606 [22.444]	-5.994 (1.545)	0.000	-6.129*** (1.711)
Observations	1002	501	501			
<i>Panel B: Continuing-generation students</i>						
	All	Parental background				Cond. gap
Belief		No postgr.	Postgr.	Diff	P-value	
Enroll post-gr. degree	51.739 [30.204]	49.053 [29.864]	57.256 [30.241]	-8.203 (2.855)	0.004	-9.922*** (3.408)
Complete undergrad. degree	88.124 [14.790]	87.107 [15.231]	90.213 [13.648]	-3.107 (1.403)	0.027	-2.099 (1.661)
Get a First	56.691 [21.502]	57.662 [21.269]	54.695 [21.904]	2.967 (2.045)	0.147	1.700 (2.605)
Graduate (post-gr.)	76.606 [22.444]	75.488 [22.351]	78.896 [22.529]	-3.408 (2.141)	0.112	-2.595 (2.841)
Observations	501	337	164			

Notes: Standard deviations given in square brackets, standard errors given in round brackets. Panel A separately provides mean beliefs for the whole sample (Column 2), by whether at least one parent has a degree (Columns 3 and 4), the unconditional difference in beliefs between first- and continuing-generation students (Column 5), and the conditional difference in beliefs (Column 7). Column 3 refers to first-generation students, whilst Column 4 refers to continuing-generation students. P-values for a test of difference in means are provided in Column 6. The conditional gaps refer to the coefficients of a first-generation-student dummy variable, and is estimated in an OLS regression where each belief variable is regressed on the first-generation dummy, a gender dummy, age of the respondent, and university and subject fixed effects. Panel B shows a similar analysis for the sample of continuing-generation students: the breakdown by parental background distinguishes between students whose parents have a postgraduate degree and students whose parents only have a first degree.

time, a direct comparison between the two samples is not possible, as the age structure of the two samples is not the same. It seems very likely that the actual continuation rates of students in the cohort that we study will be higher than what is currently observed in the

adult population.¹⁶

Turning to average beliefs about performance, students believe there is a 89% chance they will complete their undergraduate degree. This estimate is fairly consistent: in the UK, the percentage of full-time first-degree students who are projected not to obtain a degree ranges between 10.1% and 10.7% for full-time first-degree students starting their undergraduate degree in 2011 or later (Higher Education Statistics Agency 2018). Interestingly, students in our sample seem very optimistic about their performance in terms of final grades obtained for their undergraduate degree. On average, students believe that the likelihood of obtaining First-class honors conditional on graduating is 56%. In the UK, conditional on starting a degree and graduating, only 28% of all full-time first-degree qualifiers obtain First-class honors, while 49% obtain Upper Second-class honors (2.1) and 23% obtain Lower Second-class honors (2.2) or Third-class honors (Higher Education Statistics Agency 2019*b*). While this discrepancy may seem surprising at first, it is consistent with the results from previous studies, which have documented that undergraduate students are overly optimistic about their grade performance (see, e.g., Stinebrickner and Stinebrickner 2012). Consistent with previous work, we find that students in their final year perceive the likelihood of obtaining First-class honors to be 2.62 percentage points lower compared to students in their first or second year (p -value=0.0918). Moreover, consistent with the results of other studies documenting gender differences in (over)confidence (see, e.g., Niederle and Vesterlund, 2007; Mobius et al., 2011; Stinebrickner and Stinebrickner, 2012), we find that male students perceive the likelihood of getting a First to be 6.49 percentage points higher than female students (p -value < 0.001), despite the fact that there is no actual gender gap in the percentage of students obtaining First-class honors in the UK.

¹⁶Consistent with data on actual continuation rates, we find students' intentions to enroll in postgraduate education to be heterogeneous across subjects. In our sample, the reported probability of enrolling in a postgraduate degree spans from 19% and 34% for students currently studying Veterinary Science or Medicine and Dentistry to 58% for students studying Physical Sciences (see column 6 of Table C.3). This is in line with the data presented in Wakeling and Hampden-Thompson (2013), showing that Physical Sciences is the subject area with the highest progression rate towards postgraduate degrees, whereas Medicine and Dentistry is the discipline with the lowest.

4.2. *Heterogeneity in Perceived Returns*

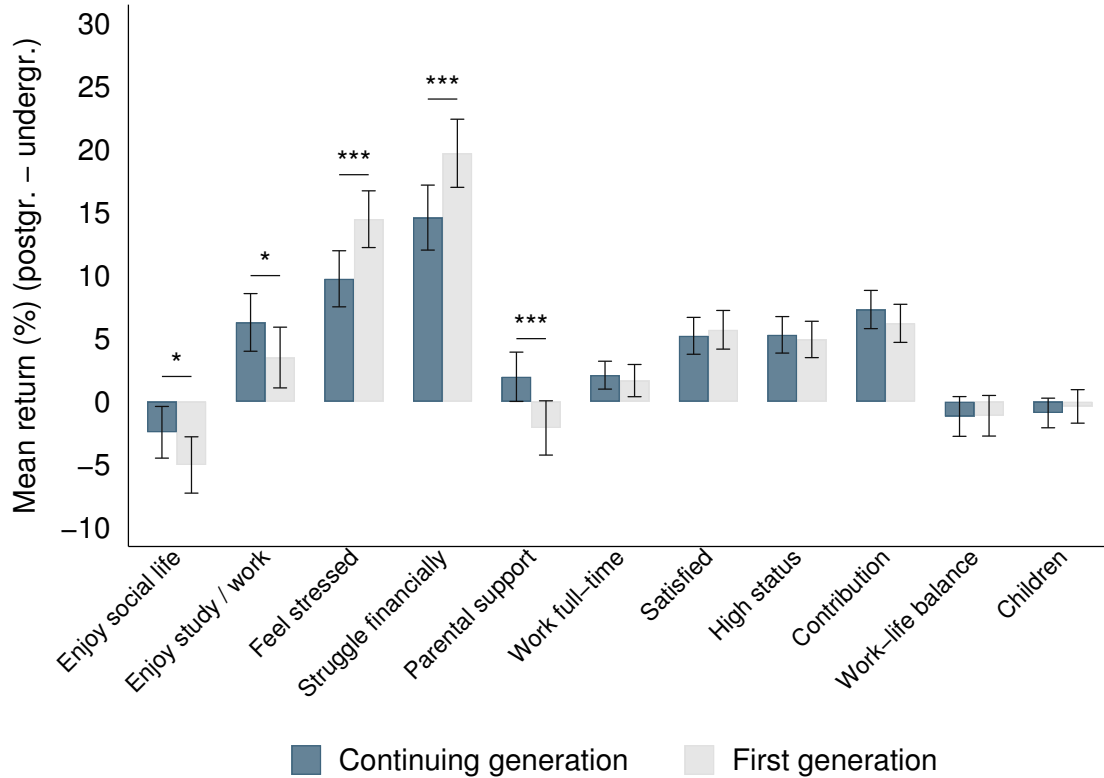
To understand what may be driving the socioeconomic gaps in enrollment rates, we investigate whether students from different backgrounds perceive the immediate and later-life outcomes of postgraduate education as different. We first examine how first- and continuing-generation students perceive the immediate returns to postgraduate education. Panel A of Table 3 shows the average stated likelihoods in each of the two scenarios for the different binary outcomes we elicit, both for the whole sample and separately for first- and continuing-generation students. Figure 2 shows the mean difference in beliefs by SES for all binary outcomes.¹⁷

Looking at differences across socioeconomic status, we note that both low and high SES students report a lower probability of enjoying their social life in the 1-2 years after graduating with an undergraduate degree if they pursue a postgraduate degree compared to the scenario in which they start working instead.¹⁸ This difference is significantly larger for low SES students. However, both groups of students also report a higher probability of enjoying what they do if they enroll in a postgraduate degree. Individuals are also more likely to report they will feel stressed and struggle financially if they continue on to a postgraduate degree, with perceived costs being significantly larger for low SES students. We find no significant differences between first- and continuing-generation students in the self-reported probability of having to work alongside their studies. Furthermore, low SES students perceive the immediate costs of postgraduate education, calculated as the sum of expected tuition fees and forgone earnings, as lower (see also Appendix Figure C.4). More specifically, first-generation students expect to pay £8,962 in tuition fees on average, whilst continuing-generation students expect the tuition fees to be around £9,482. The difference between the two groups, while statistically significant (p -value = 0.0364), is relatively small in magni-

¹⁷Figure C.3 shows the kernel densities of individual beliefs about returns to postgraduate education in terms of the different binary outcomes 1-2 years after graduation and at age 35, separately for first- and continuing-generation students.

¹⁸These results contrast with the findings in Boneva and Rauh (2019), who find that both low and high SES secondary school students believe their social lives will improve on average if they enroll in an undergraduate degree instead of starting to work.

Figure 2. : Returns to postgraduate education by parental education



Notes: The Figure shows average perceived difference in the probability of immediate and later-life binary outcomes between obtaining a postgraduate degree or only obtaining an undergraduate degree by first-generation students (gray bars) and continuing-generation students (blue bars). The black caps represent 95% confidence intervals and stars indicate statistical significance of differences by parental background: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

tude.¹⁹ Consistent with the differences in expected earnings at age 35, which we document below, first-generation students perceive the foregone earnings as significantly lower relative to continuing-generation students. The average expected forgone earnings are £28,057 for continuing-generation and £26,368 for first-generation students (p -value = 0.0412).

Strikingly, even concerns about parental support unrelated to finances show large differ-

¹⁹We note that this difference could be driven by high SES students expecting to enroll in higher-ranked universities, which tend to offer more expensive degrees. Tuition fees for postgraduate degrees are not capped and vary significantly across universities and subject fields.

ences. While high SES students report they will be more likely to have parental support if they continue with their education, the opposite holds true for low SES students, and the difference across socioeconomic groups is highly significant. It is worth noting that the perceived parental support for continuing-generation students is driven by the subgroup of students whose parents have a postgraduate qualification.²⁰

We then analyze the self-reported likelihood of outcomes at age 35, as well as expected earnings at age 35 conditional on working full-time. Panel B of Table 3 shows mean beliefs for outcomes at age 35 for the full sample as well as separately for first- and continuing-generation students. The outcomes refer to the two scenarios in which the highest educational qualification is an undergraduate or postgraduate degree, respectively. Both first- and continuing-generation students expect a higher income at age 35 if they obtain a postgraduate qualification. On average, in our sample, expected earnings are £41,863 and £48,332, for the scenarios in which the highest educational qualification is an undergraduate and a postgraduate degree, respectively. We note that the difference in earnings across the two scenarios for continuing-generation students is significantly higher than for first-generation students.

Turning to returns about non-pecuniary later-life outcomes, both first- and continuing-generation students in our sample report a higher likelihood of being satisfied with their career, having a high status in society, and being able to contribute to society if they obtain a postgraduate qualification. No significant differences are found, for either group, in the likelihood of having a good work-life balance or having children at age 35. We find no significant differences by SES for these later-life non-pecuniary returns.

We also look at differences in perceived returns for both immediate and later-life outcomes, between the subsamples of continuing-generation students whose parents did and did not complete postgraduate education (see Table C.5 and Figures C.5 and C.6). Results show that the only significant difference in terms of immediate outcomes is the perceived parental support if they do or do not enroll in a postgraduate degree. While continuing-generation

²⁰The difference in perceived support between the two subgroups of high SES students is significant at the 1% level. See Table C.5 for the full set of results for the continuing-generation group.

students, whose parents do not have postgraduate qualifications, think it less likely that their parents will approve of their choice if they continue to higher education than if they start working instead, the opposite holds true for students who have at least one parent with postgraduate qualifications. Looking at outcomes at age 35, students whose parents have a postgraduate degree perceive a larger difference in earnings and in the probability of having a high status in society if they continue with a postgraduate degree compared to the other continuing-generation students.

Finally, we also examine differences in perceived returns by whether continuing-generation students have attended a private or state school. Results are presented in Appendix Table C.6 and indicate that continuing-generation students who attended different school types only differ in their perception of financial benefits and costs to postgraduate education. Continuing-generation students who attended a state school perceive a larger difference in the probability of struggling financially if they pursue postgraduate education than students who attended a private school, despite perceiving the immediate costs of postgraduate education as significantly lower. Turning to earnings at age 35, students who attended a state school perceive a smaller difference in earnings if they continue with a postgraduate degree compared to the rest of the continuing-generation group.

Table 3—: Mean beliefs for immediate and later-life outcomes by parental education

Belief	All			First generation			Continuing generation			Diff-in-diff
	Undergr	Postgr	Diff	Undergr	Postgr	Diff	Undergr	Postgr	Diff	
<i>Panel A: Immediate Outcomes</i>										
Enjoy social life	63.134 [21.004]	59.409 [21.650]	-3.725 0.000	61.922 [21.517]	56.902 [22.670]	-5.020 0.000	64.345 [20.427]	61.916 [20.296]	-2.429 0.020	-2.591* (1.543)
Enjoy study / work	63.533 [21.638]	68.424 [21.005]	4.890 0.000	63.148 [22.100]	66.647 [21.960]	3.499 0.004	63.920 [21.181]	70.204 [19.866]	6.284 0.000	-2.785* (1.691)
Feel stressed	61.366 [23.343]	73.473 [21.793]	12.107 0.000	59.988 [24.394]	74.458 [22.220]	14.470 0.000	62.744 [22.182]	72.488 [21.335]	9.744 0.000	4.726*** (1.611)
Struggle financially	42.936 [26.528]	60.086 [26.492]	17.150 0.000	41.784 [26.684]	61.483 [27.091]	19.699 0.000	44.090 [26.348]	58.687 [25.829]	14.596 0.000	5.103*** (1.900)
Parental support	79.002 [24.021]	78.944 [24.263]	-0.058 0.938	78.495 [25.252]	76.409 [26.354]	-2.086 0.057	79.510 [22.735]	81.484 [21.700]	1.974 0.048	-4.060*** (1.480)
Immediate cost	0.000 [.]	36433.622 [13646.167]	36433.622 0.000	0.000 [.]	35330.329 [13879.052]	35330.329 0.000	0.000 [.]	37539.122 [13331.214]	37539.122 0.000	-2208.793** (860.226)
<i>Panel B: Later-Life Outcomes</i>										
Earnings	41862.980 [17473.994]	48332.258 [17841.247]	6469.278 0.000	40329.152 [17641.394]	46050.956 [17776.079]	5721.804 0.000	43399.876 [17185.267]	50618.122 [17629.888]	7218.246 0.000	-1496.442** (714.046)
Work full-time	83.650 [18.061]	85.536 [17.428]	1.886 0.000	84.305 [18.597]	85.976 [17.961]	1.671 0.010	82.994 [17.502]	85.096 [16.884]	2.102 0.000	-0.431 (0.860)
Satisfied with career	68.940 [19.749]	74.400 [17.647]	5.460 0.000	69.010 [21.033]	74.709 [18.639]	5.699 0.000	68.870 [18.396]	74.092 [16.610]	5.222 0.000	0.477 (1.079)
High status	54.249 [23.943]	59.366 [23.452]	5.117 0.000	52.536 [24.101]	57.470 [23.542]	4.934 0.000	55.958 [23.686]	61.257 [23.233]	5.299 0.000	-0.365 (1.039)
Contribution	65.459 [22.662]	72.219 [20.951]	6.759 0.000	65.427 [23.345]	71.639 [21.294]	6.212 0.000	65.491 [21.981]	72.798 [20.606]	7.307 0.000	-1.096 (1.089)
Work-life balance	63.781 [20.665]	62.636 [21.140]	-1.146 0.046	62.687 [21.585]	61.569 [21.473]	-1.118 0.173	64.876 [19.663]	63.703 [20.769]	-1.174 0.144	0.056 (1.147)
Children	61.992 [31.198]	61.354 [30.331]	-0.638 0.157	61.986 [32.139]	61.608 [31.058]	-0.378 0.576	61.998 [30.262]	61.100 [29.616]	-0.898 0.134	0.520 (0.902)

Notes: Standard deviations given in square brackets, standard errors given in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. This table provides mean beliefs for the whole sample and by the education level of the respondent's parents. Columns 1-3 provide results for the whole sample. Columns 4-6 are for respondents for whom neither parent went to university, while Columns 7-9 are for respondents for whom at least one parent went to university. Within each group, the first two columns give mean beliefs for the respective characteristic under the scenarios of having an undergraduate or postgraduate degree as the highest qualification, respectively. Mean beliefs are given on a 0-100 scale other than for expected earnings and immediate costs, which are in pounds. The third column gives the mean difference between these two beliefs, with the p-value from a t-test of difference in means reported underneath. Column 10 ('Diff-in-diff') gives the average difference for respondents for whom neither parent has a degree minus the average difference for respondents for whom at least one parent has a degree.

5. Choice Model Estimation

To investigate the role of beliefs in explaining socioeconomic differences in students' intentions to pursue postgraduate education, we estimate a choice model in which students' perceived probability of enrolling in a postgraduate degree is modelled as a function of perceived returns. Modelling subjective choice probabilities has the advantage that respondents can express uncertainty about their actions (Manski 1999; Blass, Lach and Manski 2010). We first estimate the choice model under the assumption of homogeneous preferences to investigate the relative importance of different motives in the choice. We then allow for heterogeneous preferences across socioeconomic groups and examine to what extent the socioeconomic enrollment gap can be explained by differences in beliefs and preferences.

5.1. The Choice Problem

We analyze the choice problem of a student i who is currently enrolled in an undergraduate degree. The student has to choose whether to continue with postgraduate education ($g = 1$) or start working instead ($g = 0$). Each level of human capital investment results in different immediate and later-life outcomes, which can be of a binary or continuous nature. Immediate outcomes refer to outcomes that materialize during the 1-2 years following the completion of an undergraduate degree. Later-life outcomes refer to outcomes which materialize at age 35, i.e., once the student has entered the labor market. The student derives utility from these different outcomes and discounts later-life utility at a rate $\beta^{\tau_i} < 1$, where $\tau_i > 0$ is the difference between age 35 and the student's current age.²¹

The student forms beliefs about the likelihood that each of these outcomes will occur, and chooses whether to continue with postgraduate education so as to maximize her subjective expected utility derived from the choice. Let $\{b_{n_I}^I \in \{0, 1\}\}_{n_I=1}^{N_I}$ and $\{b_{n_L}^L \in \{0, 1\}\}_{n_L=1}^{N_L}$ denote the immediate and later-life binary outcomes, respectively, with $N_I + N_L = N$. The former set of binary variables includes whether the student enjoys their social life, enjoys

²¹We note that a fully-specified model would have included all future time periods, not just the time periods that we study. It is important to keep this simplification in mind when interpreting the results of our study.

their study/work, feels stressed, struggles financially, has parental support in their choice, and completes a postgraduate degree, while the latter includes whether the student works full-time, is satisfied with their professional career, has a high status in society, contributes to society, has a good work-life balance, and has children (see Table 1). If the student decides to enroll in postgraduate education, she incurs a continuous immediate cost c , which we define as the sum of tuition fees and forgone earnings.²² At age 35, the student has earnings y (conditional on working full-time), which depend on whether the student has pursued a postgraduate degree or not.

We allow utility to be a function of the different immediate and later-life outcomes as well as individual characteristics Z_i . The individual chooses alternative g so as to maximize her (discounted) subjective expected utility (SEU):

$$SEU_{ig} = \int U_i(b^I, c, Z_i) dP_{ig}(b^I, c) + \beta^{\tau_i} \int U_i(b^L, y, Z_i) dP_{ig}(b^L, y) + \epsilon_{ig}$$

where $P_{ig}(X)$ denotes the subjective probability of outcomes X occurring if alternative g is chosen. ϵ_{ig} is a random utility component that captures uncertainty that is unknown to both the econometrician and the decision-maker at the time of the survey.

Let q_{ig} denote the choice probability reported by individual i for alternative g . In this case, q_{ig} can be interpreted as the subjective probability that person i places on the event that the realizations of ϵ_{ig} will be such that it will be optimal to choose option g (see Blass, Lach and Manski 2010). At the time the survey is taken, the decision-maker can face *resolvable uncertainty*, i.e., uncertainty about utility components that would be known in an actual choice setting, as well as *unresolvable uncertainty*, i.e., uncertainty about utility components

²²In this model, financial costs enter the choice problem as a cost to the student's immediate utility. We assume students are not budget constrained, which is consistent with the institutional setting in which we conduct the study. In the UK, apart from bursaries, grants and studentships, students have the possibility of funding their postgraduate education through loans from the UK Government. Postgraduate Master's loans are loans that help students with course fees and living costs while they study for a postgraduate master's course. Students who take out a loan have to start repaying it when their income is above a certain threshold. The loan amount students can take out is not dependent on the student or family income, and hence students from different socioeconomic background face no differences in access to this type of credit made available by the Government.

that the respondent believes to remain unknown in an actual choice setting. In our application, we allow for both resolvable and unresolvable uncertainty, as the choice of postgraduate education lies in the future (and hence some information may become known by the time the action needs to be taken) and has uncertain consequences.²³

In order to use the elicited choice probabilities to estimate the choice model, we make several assumptions. In particular, we assume that the components of ϵ_{ig} are objectively *i.i.d.* with a Type-I extreme value distribution, and that respondents make the same assumptions subjectively. Further assuming that utility is additively separable across the different outcomes, we can write the perceived probability of alternative $g = 1$ being chosen as:

$$q_{ig} = \Lambda \left(\sum_{n_I=1}^{N_I} [P_{ig=1}(b_{n_I} = 1) - P_{ig=0}(b_{n_I} = 1)] \Delta u_{n_I}(Z_i) + [E_{ig=1}(c) - E_{ig=0}(c)] \gamma_c(Z_i) \right. \\ \left. + \beta^{\tau_i} \left[\sum_{n_L=1}^{N_L} [P_{ig=1}(b_{n_L} = 1) - P_{ig=0}(b_{n_L} = 1)] \Delta u_{n_L}(Z_i) + [E_{ig=1}(y) - E_{ig=0}(y)] \gamma_y(Z_i) \right] \right).$$

where $\Lambda(\cdot)$ is the logistic function. $\Delta u_{n_I}(Z_i)$ and $\Delta u_{n_L}(Z_i)$ capture the differences in utility which arise from the occurrence of the different binary outcomes for an individual with characteristics Z_i . This difference is defined as $\Delta u_{n_I}(Z_i) \equiv u_{n_I}(b_{n_I} = 1, Z_i) - u_{n_I}(b_{n_I} = 0, Z_i)$ and it is defined analogously for later-life binary outcomes.²⁴ $\gamma_c(Z_i)$ and $\gamma_y(Z_i)$ are the weights an individual with characteristics Z_i places on expected immediate costs and later-life earnings. In this framework, the utility derived from the vector of outcomes can differ across individuals with different characteristics Z_i . This flexible functional form allows us to capture socioeconomic differences in the utility individuals derive from the different outcomes.²⁵

²³We note that if the decision-maker *only* faced unresolvable uncertainty, she would place a subjective probability of one on the alternative that maximizes subjective expected utility, i.e., the distribution of stated probabilities would be degenerate (see Blass, Lach and Manski 2010). As can be seen in Appendix Figure C.1, a substantial proportion of respondents state probabilities different from zero and one. Respondents seem to face at least some uncertainty that is perceived to be resolvable.

²⁴ $u_{n_I}(b_n^I, Z_i)$ and $u_{n_L}(b_n^L, Z_i)$ is the utility an individual with characteristics Z_i derives from the immediate and later-life binary outcomes.

²⁵We follow the approach commonly used in the subjective expectations literature and specify that the subjective expected utility is additively separable across the different outcomes (see, e.g., Delavande 2008; Zafar 2013; Giustinelli 2016). In contrast to those studies, we model subjective choice probabilities rather than stated choices, which has the advantage that respondents can express

We elicit individual beliefs using the hypothetical investment scenarios described in Section 2. More specifically, we elicit subjective probabilities of the various immediate and later-life binary outcomes occurring, $P_{ig}(b_{n_I} = 1)$ and $P_{ig}(b_{n_L} = 1)$, as well as individual beliefs about expected costs and earnings, $E_{ig}(c)$ and $E_{ig}(y)$. In most cases, we elicit those beliefs separately for the scenarios in which the student does, or does not, decide to pursue a postgraduate degree.. Two notable exceptions are the perceived probability of graduating from a postgraduate degree if the student does not enroll in one and the immediate costs incurred if the student chooses not to obtain postgraduate education. These are both assumed to be zero.

The parameters to be estimated are the $\Delta u_{n_I}(Z_i)$'s and $\Delta u_{n_L}(Z_i)$'s as well as $\gamma_c(Z_i)$ and $\gamma_y(Z_i)$. We set the discount rate to $\beta = 0.96$. We estimate the preference parameters by maximum likelihood, using the method proposed by Papke and Wooldridge (1996). The estimation strategy makes use of the logit link function (that is, the logit transformation of the response variable) and the Bernoulli distribution. The quasi-maximum likelihood estimator of the parameters obtained from this approach is consistent and \sqrt{N} -asymptotically normal, regardless of the distribution of the outcome conditional on the explanatory variables. This approach also has the advantage that it can handle proportions data in which zeros and ones may appear as well as intermediate values.

5.2. Choice Model Estimates - Homogeneous Preferences

Column 1 of Table 4 presents the estimation results under the assumption of homogeneous preferences.²⁶ Several non-pecuniary aspects relating to students' lives during the 1-2 years

uncertainty about their actions. For a discussion of this approach, see Manski (1999) and Blass, Lach and Manski (2010). In contrast to the application presented in Blass, Lach and Manski (2010), our application features both resolvable and unresolvable uncertainty. For a recent application which also uses subjective choice probabilities and features both resolvable and unresolvable uncertainty, see Arcidiacono et al. (2020).

²⁶Appendix Table C.7 presents the Spearman rank correlations between the different return variables used in the estimation. The correlations range from 0.00 to 0.38 in absolute terms, indicating that collinearity is unlikely to be an issue in our estimation. Table C.8 in Appendix C shows that our results are robust to excluding outliers. For each return variable, we consider observations in the top and bottom percentile of the return distribution as outliers. Tables C.9 and C.10 in Appendix C show that the results are also robust to estimating the choice model on the subsample of students whose

after finishing their undergraduate degree significantly predict students' plans of pursuing a postgraduate education. Perceived returns in terms of enjoying one's social life, one's study/work, and one's parental support significantly and positively predict the perceived likelihood of enrolling in a postgraduate degree. We look at the relative magnitudes of the coefficients to get a sense of the importance of each binary outcome in the choice. The most important immediate factor for students in our sample is enjoying their study/work during the 1-2 years after finishing their undergraduate degree followed by having parental support. These results highlight the importance of perceived immediate non-pecuniary factors in students' educational investment decisions, and are consistent with findings from Zafar (2013), Belfield et al. (2019) and Boneva and Rauh (2019) that non-pecuniary motives drive students' decisions about their education. However, financial considerations play a role as well. We find that concerns about struggling financially as well as the expected immediate costs, i.e. sum of expected tuition fees and forgone earnings, are negatively related to the stated likelihood of postgraduate degree enrollment.

Looking at binary outcomes at age 35, what matters most is whether students will be satisfied with their professional career, and whether they will have a high status in society. In contrast, the point estimate for the weight placed on contributions to society is a precisely estimated zero. Concerns about family formation seem to play a role as the perceived possibility of having children also positively correlates with the decision to enroll in a postgraduate degree. Finally, we find that pecuniary returns at age 35 (i.e., expected earnings conditional on working full-time) matter for students' decisions about postgraduate education. Overall, the results suggest that both perceived immediate and perceived later-life returns to postgraduate education are important in students' choices.²⁷

To provide some interpretation of our parameter estimates, we provide a back-of-the-envelope calculation of the willingness-to-pay (WTP) for each binary outcome. The WTP can be interpreted as the amount of yearly gross earnings a student would be willing to

current university is in England and students for whom the self-reported probability of graduating from their undergraduate degree is above 50%, respectively.

²⁷The descriptive evidence obtained from the estimation of the choice model yields insights into which factors are predictive of students' intentions to obtain a postgraduate degree. Given that beliefs are potentially endogenous, the estimates of our choice model cannot be given a causal interpretation.

forgo at age 35 for a one percentage point change in the probability of the binary outcome n occurring. The WTP for outcome n can be calculated as: $WTP_n = \frac{0.01\Delta u_n}{\gamma_y}$, where Δu_n is the coefficient attached to the binary outcome of interest, and γ_y is the coefficient on earnings at age 35. Willingness-to-pay estimates are reported in column 2 of Table 4 and expressed in units of £. Standard errors of these non-linear combinations of estimators are calculated using the Delta method. Our results indicate that students are willing to accept a lower income at age 35 for a one percentage point change in the probability of several non-pecuniary immediate outcomes. For example, students are willing to forgo £608 in annual gross income for a one percentage point increase in the probability of enjoying what they do in the 1-2 years after their undergraduate degree, and £530 for an equivalent change in the probability of having parental support in their choice. Finally, students are also willing to accept £674 and £545 lower earnings for a one percentage point increase in the probability of being satisfied with their professional career and having a high status in society at age 35, respectively. While these estimates have to be interpreted with caution as the calculation rests on a number of assumptions (e.g. we abstract from earnings growth over the life cycle), they do highlight the economic relevance of non-pecuniary factors in the choice. We also calculate the WTP for the immediate expected costs of pursuing a postgraduate degree. This captures the gross annual earnings at age 35 students would have to be compensated with, for a one £ increase in the immediate costs of pursuing a postgraduate education. The WTP is calculated as $\frac{\gamma_c}{\gamma_y}$, where γ_c is the coefficient on the immediate costs of a postgraduate degree. We see that students would be willing to trade-off £0.38 in immediate costs for a one £ increase in earnings at age 35.

5.3. Choice Model Estimates - Heterogeneous Preferences

We now turn to the question of whether students from low and high SES backgrounds differ in their preferences over the different attributes. For this purpose, we split the sample by whether or not students have at least one parent who attended university, and we estimate the choice model separately for the two groups. Results are reported in columns 3-6 of Table 4. We find sizeable differences in the point estimates of the preference parameters we estimate,

although most of these differences are statistically insignificant (see columns 7-8 of Table 4). Nonetheless, some notable patterns emerge. For example, expected earnings and career satisfaction at age 35 only seem to matter for continuing-generation students, whereas low SES students place more weight on enjoying their social life and not feeling stressed in the 1-2 years after the completion of their undergraduate degree. Interestingly, despite perceiving a lower immediate cost of postgraduate education, first-generation students' intentions to enroll in a postgraduate degree significantly depend on their expected costs of such investment, while this is not the case for continuing-generation students.²⁸

Finally, we investigate among high SES students whether preferences differ based on parental postgraduate education. For this purpose, we focus on the subsample of continuing-generation students, estimating the choice model separately for those with and without at least one parent who holds a postgraduate qualification. The results are reported in columns 3-6 of Table 5. Although most of the differences between the estimated preference parameters are again statistically insignificant (see columns 7-8 of Table 5), we note that students from the highest socioeconomic background seem to place more weight on whether they will be satisfied with their career at age 35 and whether they will have a good work-life balance. Parental support, on the other hand, plays a significant role in the choice of high SES students whose parents do not have a postgraduate degree, but does not significantly enter the choice model for students whose parents completed postgraduate education.

²⁸We note that the probability of working full-time at age 35 negatively enters the choice model for first-generation students. This result is driven by the subsample of female respondents who are the first-generation in their family to go to university.

Table 4—: Choice model estimation by parental education

	All		First generation		Continuing generation		Difference (p-value)	
	Coef.	WTP	Coef.	WTP	Coef.	WTP	Coef.	WTP
Expected earnings at age 35 ($10000\gamma_y$)	0.193*** (0.066)		0.083 (0.092)		0.306*** (0.096)		0.093	
Enjoy social life (Δu_1)	0.456** (0.188)	235.787* (129.654)	0.749*** (0.238)	904.316 (1064.756)	0.172 (0.291)	56.192 (98.197)	0.125	0.427
Enjoy study / work (Δu_2)	1.178*** (0.181)	608.803*** (221.525)	0.926*** (0.237)	1117.802 (1238.350)	1.584*** (0.263)	517.916*** (180.298)	0.063	0.632
Feel stressed (Δu_3)	-0.288* (0.152)	-148.582 (90.580)	-0.372* (0.217)	-448.959 (536.747)	-0.241 (0.229)	-78.824 (79.051)	0.678	0.495
Struggle financially (Δu_4)	-0.527*** (0.136)	-272.418** (117.692)	-0.473** (0.193)	-570.778 (663.608)	-0.494** (0.193)	-161.450* (84.253)	0.939	0.540
Parental support (Δu_5)	1.026*** (0.185)	530.239*** (203.485)	0.913*** (0.248)	1102.408 (1280.104)	1.106*** (0.282)	361.577** (143.594)	0.609	0.565
Immediate cost ($10000\gamma_c$)	-0.074*** (0.023)	-0.383** (0.162)	-0.104*** (0.031)	-1.252 (1.406)	-0.027 (0.033)	-0.090 (0.107)	0.092	0.410
Work full time at age 35 (Δu_6)	-0.679 (0.550)	-351.092 (308.242)	-1.889** (0.736)	-2280.337 (2750.617)	0.599 (0.734)	195.812 (254.648)	0.017	0.370
Satisfied with career at age 35 (Δu_7)	1.305** (0.536)	674.319* (383.714)	0.930 (0.797)	1122.832 (1720.207)	1.844*** (0.683)	603.029** (302.474)	0.384	0.766
High status at age 35 (Δu_8)	1.056** (0.474)	545.930 (340.223)	1.128* (0.681)	1361.706 (1848.878)	0.889 (0.691)	290.833 (265.356)	0.806	0.566
Contribute to society at age 35 (Δu_9)	-0.017 (0.486)	-9.016 (250.960)	0.948 (0.715)	1143.823 (1588.732)	-0.908 (0.670)	-296.981 (228.036)	0.058	0.369
Work-life balance at age 35 (Δu_{10})	0.713 (0.456)	368.255 (269.393)	0.352 (0.629)	425.446 (927.599)	1.036* (0.624)	338.879 (224.850)	0.440	0.928
Have children at age 35 (Δu_{11})	1.156** (0.560)	597.491 (370.432)	0.250 (0.836)	301.762 (1106.713)	1.738** (0.730)	568.503* (307.514)	0.180	0.816
Postgraduate graduation probability	0.405*** (0.126)	209.316** (99.331)	0.596*** (0.165)	720.025 (835.742)	0.091 (0.188)	29.883 (62.789)	0.044	0.410
Observations	989	989	495	495	494	494		
Variance explained	0.269		0.283		0.283			

Notes: Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Column 1 presents the estimates of the choice model for the whole sample, while column 2 presents the willingness-to-pay calculations. Columns 3-4 present the results for first-generation students, columns 5-6 present the results for continuing-generation students. For the willingness to pay calculations, standard errors are calculated using the delta method. Continuing-generation students are defined as those students who have at least one parent with university education. The last row reports the R-Squared from a regression of the dependent variable on the fitted values predicted by our model.

Table 5—: Choice model estimation by parental education - Continuing-generation students

	Continuing gen.		Parents no postgr. qual.		Parents have postgr. qual.		Difference (p-value)	
	Coef.	WTP	Coef.	WTP	Coef.	WTP	Coef.	WTP
Expected earnings at age 35 ($10000\gamma_y$)	0.306*** (0.096)		0.360*** (0.126)		0.248* (0.148)		0.565	
Enjoy social life (Δu_1)	0.172 (0.291)	56.192 (98.197)	0.158 (0.387)	43.870 (109.295)	0.223 (0.431)	89.866 (188.772)	0.910	0.833
Enjoy study / work (Δu_2)	1.584*** (0.263)	517.916*** (180.298)	1.640*** (0.332)	456.030** (180.782)	1.624*** (0.445)	654.767 (421.630)	0.977	0.664
Feel stressed (Δu_3)	-0.241 (0.229)	-78.824 (79.051)	-0.511* (0.306)	-142.056 (97.538)	0.258 (0.345)	103.876 (151.958)	0.095	0.173
Struggle financially (Δu_4)	-0.494** (0.193)	-161.450* (84.253)	-0.548** (0.265)	-152.285* (92.398)	-0.470* (0.286)	-189.534 (176.984)	0.842	0.852
Parental support (Δu_5)	1.106*** (0.282)	361.577** (143.594)	1.099*** (0.328)	305.544** (141.112)	0.809 (0.564)	326.152 (278.601)	0.656	0.947
Immediate cost ($10000\gamma_c$)	-0.027 (0.033)	-0.090 (0.107)	-0.007 (0.040)	-0.019 (0.111)	-0.095 (0.062)	-0.382 (0.305)	0.233	0.263
Work full time at age 35 (Δu_6)	0.599 (0.734)	195.812 (254.648)	0.176 (0.973)	49.029 (272.433)	1.483 (1.204)	598.003 (652.665)	0.398	0.437
Satisfied with career at age 35 (Δu_7)	1.844*** (0.683)	603.029** (302.474)	1.385 (0.895)	385.089 (287.335)	2.403** (1.148)	969.148 (777.837)	0.483	0.480
High status at age 35 (Δu_8)	0.889 (0.691)	290.833 (265.356)	0.711 (0.832)	197.628 (256.892)	0.706 (1.208)	284.532 (565.310)	0.997	0.888
Contribute to society at age 35 (Δu_9)	-0.908 (0.670)	-296.981 (228.036)	-0.884 (0.953)	-245.915 (265.652)	-0.802 (1.003)	-323.360 (452.679)	0.952	0.883
Work-life balance at age 35 (Δu_{10})	1.036* (0.624)	338.879 (224.850)	0.680 (0.845)	189.041 (244.981)	1.865** (0.949)	751.918 (574.383)	0.350	0.367
Have children at age 35 (Δu_{11})	1.738** (0.730)	568.503* (307.514)	1.822** (0.851)	506.765 (325.969)	1.280 (1.392)	516.280 (590.613)	0.739	0.989
Postgraduate graduation probability	0.091 (0.188)	29.883 (62.789)	-0.050 (0.232)	-13.874 (64.408)	0.521 (0.332)	210.248 (189.776)	0.158	0.263
Observations	494	494	331	331	163	163		
Variance explained	0.283		0.257		0.352			

GRADUATE EDUCATION

Notes: Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Column 1 presents the estimates of the choice model for the subsample of continuing-generation students, while column 2 presents the willingness-to-pay calculations. Columns 3-4 present the results for continuing-generation students whose parents do not hold a postgraduate qualification, columns 5-6 present the results for continuing-generation students whose parents hold a postgraduate qualification. For the willingness to pay calculations, standard errors are calculated using the delta method. Continuing-generation students are defined as those students who have at least one parent with university education. The last row reports the R-Squared from a regression of the dependent variable on the fitted values predicted by our model.

5.4. Decomposition of Gaps in Enrollment

The results point to two explanations for why we observe gaps in intentions to enroll in a postgraduate degree between students from different socioeconomic backgrounds. First, results from the choice model suggest that students from different socioeconomic backgrounds may have different preferences over the different factors. Second, depending on their background characteristics, students hold different beliefs about the returns to postgraduate education in terms of both pecuniary and non-pecuniary outcomes, especially for outcomes that accrue in the immediate future. To the extent that beliefs are malleable and possibly formed on the basis of incorrect or incomplete information, it is important to quantify how much differences in beliefs contribute to the socioeconomic gaps in people’s intention to pursue postgraduate education.

We use the estimates from Section 5.3 to calculate the gaps in enrollment intentions predicted by our model, and decompose these gaps into a ‘beliefs effect’ and a ‘preference effect’. The former captures the effect of differences in the distribution of our covariates (i.e., beliefs about the returns to postgraduate education) across groups, while the latter captures the effect of differences in preference-parameter estimates. Denote as G_i the socioeconomic group student i belongs to, where $G_i = L$ for first-generation students and $G_i = H$ for continuing-generation students. Furthermore, let X_i be a vector of all the perceived returns that enter our choice model estimation, and δ be the vector of preference parameters. The gap in our outcome variable predicted by the model can be written as:

$$\Delta^{SES} = \underbrace{E[\Lambda(X_i\delta^H)|G_i = H] - E[\Lambda(X_i\delta^L)|G_i = H]}_{\Delta^\delta \text{ (preference effect)}} + \underbrace{E[\Lambda(X_i\delta^L)|G_i = H] - E[\Lambda(X_i\delta^L)|G_i = L]}_{\Delta^X \text{ (beliefs effect)}}$$

When we perform the decomposition exercise using the parameter estimates obtained for first- and continuing-generation students, we find that our model predicts a socioeconomic gap in students’ intentions to continue to a postgraduate degree of 3.9 percentage points, which corresponds to 75% of the actual gap (see Table 6). Furthermore, the decomposition analysis shows that, of the 3.9 percentage point SES gap predicted by the model, 91% can be

explained by socioeconomic differences in beliefs, while the remaining 9% can be explained by differences in preferences. These results are graphically illustrated in Figure C.7. Putting the numbers together, we find that differences in beliefs about the returns to postgraduate education across socioeconomic groups can explain around 70% of the actual gap in students' intentions to enroll in postgraduate education.

We repeat the exercise looking at the continuing-generation subsample only and decomposing the gap between students whose parents have a postgraduate qualification and students whose parents only have an undergraduate degree. Results for this exercise are presented in columns 3-4 of Table 6. The actual gap in intentions to enroll that we observe in the subsample of students for whom we have non-missing information about all the returns is 8.04 percentage points. Our model that accounts for differences in perceived returns and differences in preferences predicts a gap in intentions to enroll of 8.75 percentage points, which is more than the actual gap observed in the data. The decomposition analysis shows that 52% of the gap predicted by the model can be explained by differences in beliefs alone.

Table 6—: Decomposition of predicted gaps in intentions to enroll

	Gap by SES		Gap by postgr. qual.	
	Gap	P-value	Gap	P-value
Actual gap	5.212	0.006	8.036	0.005
Total predicted gap	3.916	0.046	8.753	0.001
Beliefs effect	3.618	0.001	4.588	0.012
Observations	989		494	

Notes: This table presents the results of the decomposition analysis. Columns 1 and 2 present results for the enrollment gap by SES for the full sample, while columns 3 and 4 present results for the enrollment gap by whether or not at least one parent has a postgraduate degree for the subsample of continuing-generation students.

6. Discussion

When examining individual beliefs about the immediate non-pecuniary benefits and costs of postgraduate education, a natural question to ask is whether individual characteristics and

experiences are predictive of students' beliefs about their short-term future. In particular, one important factor influencing how students form their beliefs about the returns to postgraduate education might be their current experiences of university life. In Section 6.1, we investigate how students from different backgrounds differ in how they experience university education, while in Section 6.2 we examine the determinants of students' beliefs about their short-term future. Finally, in Section 6.3, we discuss the accuracy of students' perceived returns to postgraduate education.

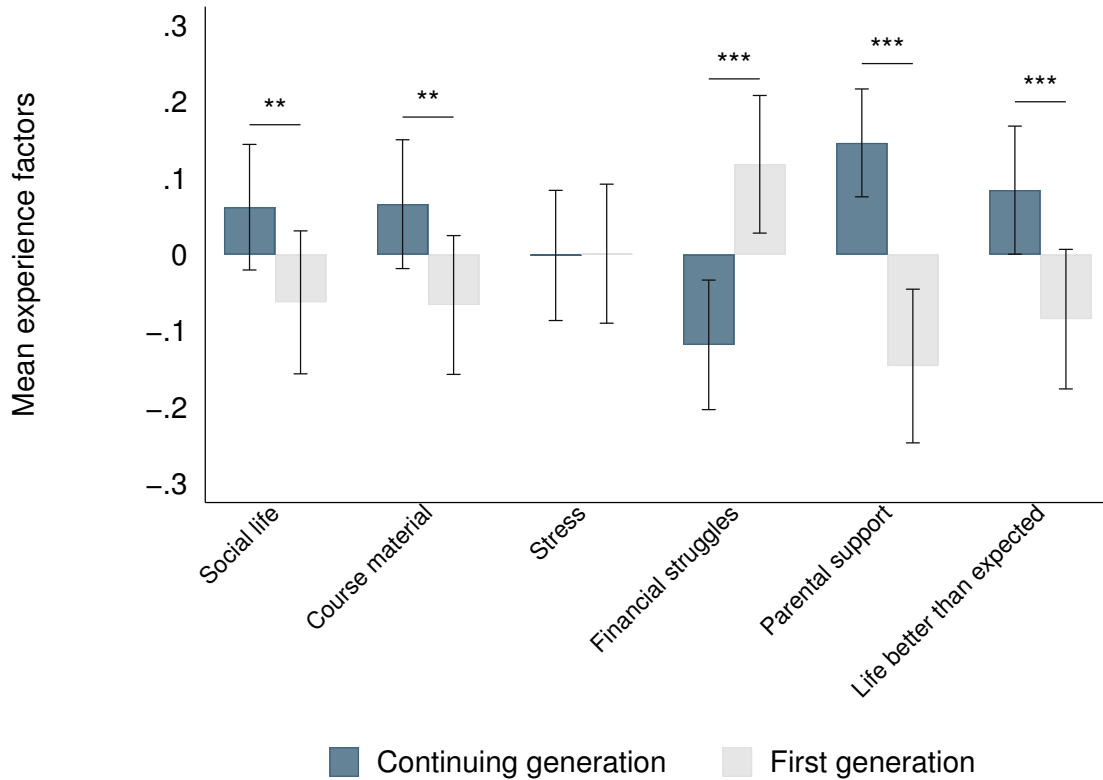
6.1. *Heterogeneity in Students' Current Experiences*

To elicit information on students' current experiences, we ask students to what extent different statements about university life apply to them on a 0-100 scale. For the purpose of this analysis, we group the survey items into six different categories, as summarized in Panel B of Table 1, and construct summary indices by extracting a factor from the different item responses in each category.²⁹ Figure 3 displays the mean values of the extracted factors separately for first- and continuing-generation students.

We find significant differences by socioeconomic status in how students experience their life at university. Continuing-generation students are more likely to enjoy their coursework, and they are more likely to report that life at university is better than expected. High SES students are also more likely to state that they have parental approval in their choice to go to university, and they are less likely to struggle financially. Among continuing-generation students, students whose parents have postgraduate qualifications, on average, report significantly higher levels of parental support but are also less likely to state that their life is better than expected (see Appendix Figure C.8). Comparing continuing-generation students with private and state school education, we find that privately-educated students are less likely to struggle financially, but do not significantly differ from students who attended a state school in any other measure of university life experiences (see Appendix Figure C.9).

²⁹Tables C.11 and C.12 in Appendix C report the average answers to how much each single statement about university life applies to the respondents, on a 0-100 scale, for the full sample and for the subgroup of continuing-generation students. Breakdowns by parental education are also provided in both tables.

Figure 3. : Experience of life at university by parental education



Notes: The figure shows the average value for the first factor from a factor analysis of the variables related to the social life, positive and negative aspects of the coursework and financial situation, as well as the standardized variables for having parental support and perceiving life at university as better than expected. Parental background is split between students who have at least one parent with university education (blue bars) and those who do not (gray bars). The black caps represent 95% confidence intervals and stars indicate statistical significance of differences by parental background: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

We also investigate how students allocate their time across various activities in a typical week during term time, and how they finance their tuition fees and living expenses (see Appendix Tables C.13-C.16). First-generation students work more than continuing-generation students (12.5 vs. 8.8 hours per week), they are more likely to work for pay and less likely to engage in work that is related to their studies. Compared to continuing-generation students, they spend less time in student societies. When looking at the work students did over the

last summer break, we find that continuing-generation students worked a smaller number of weeks, but the work that they did was more likely to be related to their studies. Furthermore, parents of continuing-generation students were more likely to know the employer their children were working for, and to help them with their application for the job. These findings highlight the importance of parental networks in students' ability to access career-enhancing employment opportunities during their studies.

Turning to the ways in which students finance their tuition fees and living expenses, we find that 82% of continuing-generation students took out a loan, while the corresponding figure for the low SES group is 95%. Out of those who did not take out a loan, 50% and 85% of first- and continuing-generation students, respectively, report being helped financially by their family, respectively. Overall, we conclude that first-generation students experience life at university very differently compared to continuing-generation students.

6.2. *Predictors of Perceived Returns*

We now turn to the question of whether students' individual characteristics and experience of life at university during their undergraduate year are predictive of their beliefs about the immediate future. Table 7 shows the results from regressing individual perceived returns to postgraduate education on students' characteristics (first generation, whether at least one parent has a postgraduate qualification, age, and gender), the student's self-reported probability of getting a First in her undergraduate degree, the extracted factors capturing students' current experiences at university (described in Section 6.1), as well as field of study and university fixed effects.

Looking at differences in beliefs by background characteristics, we note that female students report a higher probability of being stressed and struggling financially if enrolling in a postgraduate degree, but also a higher likelihood of enjoying what they will be doing. Having at least one parent with postgraduate qualification and the self-reported probability of getting a First in their undergraduate degree are positively and significantly correlated with the perceived degree of parental approval if pursuing a postgraduate degree.³⁰

³⁰For brevity, we do not report results for the determinants of perceived returns at age 35 of

Further, individual beliefs about the immediate non-pecuniary benefits and costs of graduate education may be influenced by students' actual experiences of studying towards an undergraduate degree.³¹ A student who does not enjoy social life while being enrolled in an undergraduate degree may perceive it as less likely that she will enjoy social life if she decides to enroll in a postgraduate degree. Consistent with this hypothesis, whereby current experiences shape students' beliefs about future experiences, we find that the coefficients associated to variables capturing undergraduate experiences are positive and significant along the main diagonal, i.e. the more one statement applies during undergraduate years, the more likely students think it will also apply during their postgraduate education. For example, students who report that they currently enjoy their social life are also more likely to believe that the return to enrolling in a postgraduate degree in terms of their social life is going to be greater. Similarly, students who currently enjoy studying towards their degree also believe that the return in terms of enjoying what they will do will be higher. However, having parental approval in their choice of pursuing a first degree is not associated with the belief that they will continue to have parental support in their decision to obtain postgraduate education. Perceiving life at university as better than expected is correlated with a higher perceived benefit in terms of enjoying one's social life and lower perceived costs in terms of stress and financial struggles.³²

6.3. *Are students' beliefs accurate?*

Having established the existence of socioeconomic gaps in perceived returns to postgraduate education, a natural question to ask is whether these differences in beliefs about returns reflect *actual* differences, or whether there are no actual differences in returns but students from different groups nevertheless hold different beliefs about them. It is difficult to establish postgraduate education, for which we find little relation to current experiences.

³¹See Aucejo et al. (2020) and Aucejo, French and Zafar (2021) for recent studies looking at how students' experiences and beliefs are affected by the COVID-19 pandemic.

³²In Appendix Table C.17, we present the results from regressions in which we regress the perceived returns to postgraduate education on the extracted experience factors only (i.e., we do not include any additional control variables). Again, we find that current experiences significantly predict perceived returns. The R^2 ranges from 0.012 for beliefs about receiving parental support to 0.102 for perceived financial struggles.

Table 7—: Determinants of perceived returns 1-2 years after graduation

	Social life	Study / work	Stressed	Struggle	Parents
First generation	0.002 (0.019)	-0.010 (0.022)	0.026 (0.020)	0.026 (0.024)	-0.004 (0.020)
Parent with graduate degree	0.041 (0.026)	0.041 (0.029)	-0.028 (0.028)	0.014 (0.032)	0.121*** (0.025)
Get a First	0.048 (0.046)	0.076 (0.050)	-0.024 (0.050)	-0.074 (0.056)	0.087* (0.047)
Female	-0.019 (0.018)	0.032* (0.019)	0.052*** (0.019)	0.050** (0.023)	-0.006 (0.018)
Age	0.001 (0.005)	0.007 (0.006)	-0.005 (0.005)	0.011* (0.007)	-0.007 (0.005)
Social life	0.019* (0.010)	-0.011 (0.011)	0.030*** (0.011)	0.035*** (0.013)	0.004 (0.011)
Course material	0.006 (0.011)	0.052*** (0.012)	-0.014 (0.011)	0.010 (0.013)	-0.008 (0.010)
Stress	-0.012 (0.009)	-0.010 (0.010)	0.029*** (0.010)	0.003 (0.011)	0.010 (0.009)
Financial struggles	0.004 (0.009)	0.016 (0.011)	-0.001 (0.010)	0.083*** (0.012)	0.009 (0.010)
Parental support	-0.019** (0.009)	-0.014 (0.011)	0.009 (0.010)	0.022* (0.012)	0.015 (0.010)
Life better than expected	0.036*** (0.011)	0.002 (0.013)	-0.033*** (0.011)	-0.027** (0.013)	0.002 (0.012)
Observations	962	961	961	961	961
R Squared	0.222	0.237	0.217	0.248	0.187
University fixed effects	Y	Y	Y	Y	Y
Subject fixed effects	Y	Y	Y	Y	Y

Notes: Robust standard errors from OLS estimation in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. All dependent variables are beliefs about returns (postgraduate - work), see overview of elicited beliefs about returns in Table 1. The dependent variable is indicated in the column heading. Social life, course material, stress, and financial struggles refer to the first factor from the related variables.

whether the causal effect of postgraduate education on the pecuniary and non-pecuniary outcomes that we study differs across socioeconomic groups. This is partly due to a lack of data (e.g., on the immediate non-pecuniary outcomes such as the extent to which postgraduate students enjoy their social life) and partly due to a lack of a credible source of exogenous variation that would allow us to identify the causal effect of enrolling in a postgraduate degree

on future outcomes for the different groups.

While estimating the causal returns to postgraduate education lies outside the scope of this paper, we can compare students' beliefs about returns to realized differences in earnings around age 35 across workers with/without postgraduate qualifications. We note that these realized 'postgraduate earnings premia' that we estimate from observational data cannot be interpreted as causal, as they may also be driven by differences in selection, e.g., on ability or motivation.

To shed further light on how perceived returns to postgraduate education compare to estimated postgraduate earnings premia, we use the UK Household Longitudinal Study (UK HLS) for individuals aged 32-38 in waves 6-8, corresponding to the period between 2014 and 2018. More concretely, we estimate postgraduate earnings premia for the sample of respondents with at least a first degree or equivalent and employed full-time, and allow the estimated earnings premia to differ by parental education. We classify respondents as continuing generation if at least one of their parents has a university degree or higher, and take as dependent variable annual gross labor earnings.

Results from this exercise are reported in column 1 of Table C.18, and show that the estimated postgraduate earnings premium in the UK is £6,035.23. Further, we note that the coefficient on the interaction effect between being a first-generation student and having a postgraduate degree is negative at £2,892.62 but not statistically significant. In columns 2 and 3, we examine how the estimated postgraduate earnings premium changes when we control for observable measures of cognitive and non-cognitive skills. In column 2, we control for numerical and verbal skills as measured in the third wave of the UK HLS. In column 3, we additionally control for the Big Five personality traits, also measured in wave three.³³ Controlling for observable measures of cognitive and non-cognitive skills does not significantly alter the magnitude of the estimated postgraduate earnings premia.

We compare those estimates to the perceived returns of the students in our sample (see

³³The Big Five model is a taxonomy of one's personality that identifies five distinct character traits: *Openness*, *Conscientiousness*, *Extraversion*, *Agreeableness* and *Neuroticism*. These traits or non-cognitive skills have been found to be strongly correlated with socioeconomic outcomes such as earnings, occupation, marriage, smoking, crime, and political orientation (see, e.g., Heckman, Stixrud and Urzua, 2006; Le Moglie, Mencarini and Rapallini, 2015; Aidt and Rauh, 2018).

column 4 of Table C.18). To compute the perceived returns, we consider two observations per respondent. The first observation refers to the scenario in which the highest educational qualification achieved is an undergraduate degree, and the second refers to the case in which the student successfully completes a postgraduate degree. The dependent variable is expected earnings at age 35, conditional on working full-time. Results show that the average perceived return to a postgraduate degree for students in our sample is £7,218.25. The interaction between postgraduate qualification and first generation is negative and significant at £1,496.44. Overall, we conclude that the average perceived returns in our sample are broadly in line with estimates of realized postgraduate earnings premia.³⁴

7. Conclusion

We investigate whether differences in beliefs about returns can explain the observed socioeconomic gap in intentions to obtain postgraduate education. To answer this question, we collect novel survey data from a representative sample of undergraduate students in the UK. We elicit students' beliefs about the pecuniary and non-pecuniary benefits of postgraduate education as well as students' intentions to pursue a postgraduate degree.

Undergraduate students, who are the first generation in their family to go to university, state a 5 percentage point lower likelihood of continuing on to postgraduate education relative to continuing-generation students. They also perceive a range of both pecuniary and non-pecuniary returns to postgraduate education to be lower, and this is especially true for returns that would accrue within the 1-2 years of postgraduate studies. Differences in beliefs about the returns to postgraduate education can explain 70% of the observed first-generation/continuing-generation gap in students' intentions to enroll in a postgraduate degree. We also document large heterogeneities in intentions to enroll in a postgraduate

³⁴To test whether students form rational expectations (RE) about future outcomes for different levels of educational attainment, we compare beliefs about earnings at age 35 with realized earnings from respondents to the UK HLS. We follow the approach in d'Haultfoeuille, Gaillac and Maurel (2018) and test whether the distribution of realized earnings is a mean-preserving spread of the distribution of the beliefs we elicit. We conduct the test separately for first- and continuing-generation students (see Appendix Table C.19). We cannot reject the hypothesis that both groups form rational expectations about age-35 earnings at conventional levels of significance.

degree *within* the continuing-generation group. Students with at least one parent who holds a postgraduate qualification report an 8 percentage point higher likelihood of pursuing postgraduate education relative to the group of students whose parents have an undergraduate qualification, but not a postgraduate degree. Again, differences in beliefs across those two groups can explain a substantial share of the observed gap in intentions to enroll. Finally, we document that there are sizeable differences in how students from different backgrounds experience their lives at university, and that these differences are predictive of the perceived returns to postgraduate education.

A potential avenue for future research lies in exploring whether shifting students' beliefs about the pecuniary and non-pecuniary returns to postgraduate education has the potential of narrowing the socioeconomic enrollment gap. We note, however, that the returns to postgraduate education may vary with students' socioeconomic background, e.g., because of differences in the quality/rank of the institution currently attended or differences in parental networks, which is why it is important to design such informational interventions in a way that is not misleading. The socioeconomic gaps in students' experiences draw attention to a further important dimension of inequality. First-generation students enjoy many aspects of university life less. This finding is consistent with the beliefs documented in Boneva and Rauh (2019) showing that secondary school students, who would be the first generation in their family to go to university, perceive the immediate non-pecuniary benefits of going to university as lower compared to students from better educated backgrounds. This raises the question of *why* students' experiences are different and which policies can mitigate this socioeconomic gap. Speculating about potentially effective policies, the fact that first-generation students work more alongside their studies suggests that grants/bursaries could help them fully take part in student life. Improving students' actual experiences at university may result in more first-generation students wanting to enroll in a first degree and may also shift students' beliefs about their potential experiences during postgraduate education.

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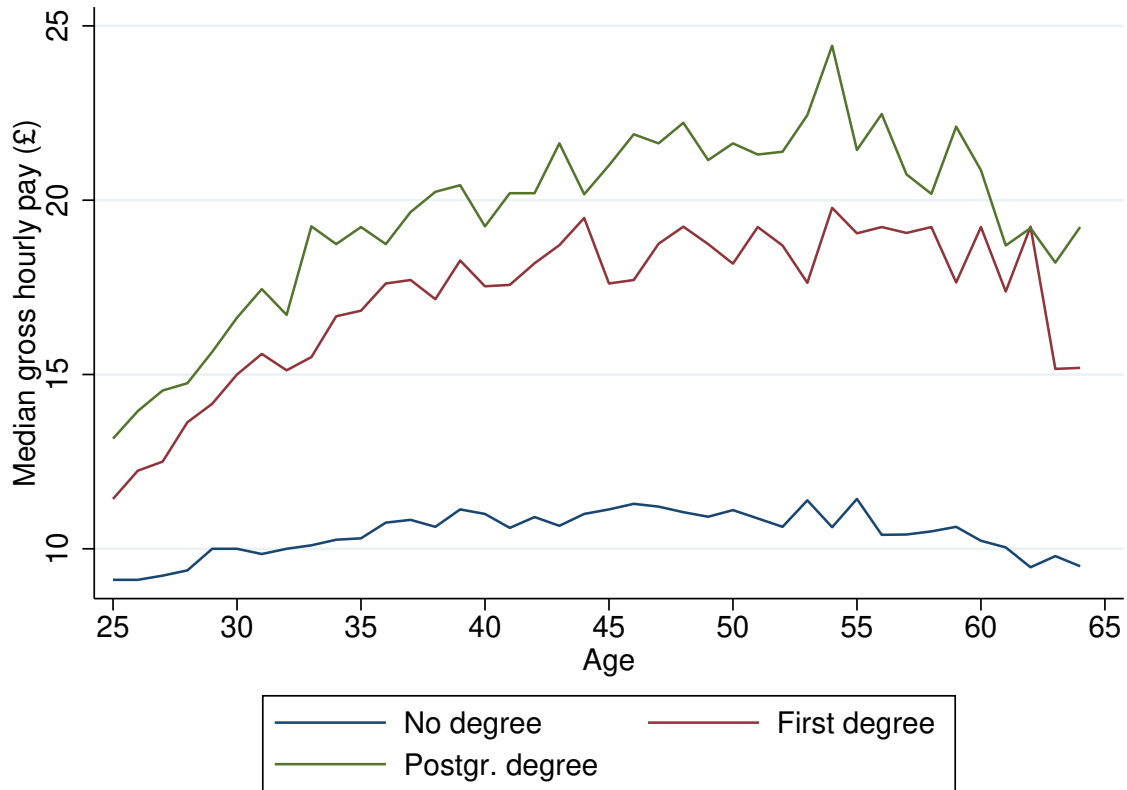
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APPENDIX A: SUPPLEMENTARY DATA

UK DATA

Data on labour market outcomes and composition of the workforce for the UK come from the quarterly Labour Force Survey (LFS), from Q1 2016 to Q4 2018. The sample includes all first-time respondents aged 25-64, who are not in full-time study and for whom information on their highest educational qualification is available. We classify First degrees and other equivalent degrees as “First degree”, all higher qualifications as “Postgraduate degree”, and other non-university qualifications as “No degree”. Income weights, as provided in the LFS dataset, are used throughout.

Figure A.1. : Gross hourly pay by educational qualification



Notes: The figure shows median gross hourly pay from an individual's main job in relation to their age for those with no university degree, a first degree only, and a postgraduate degree, respectively. The sample is restricted to individuals aged 25-64 included, who are first-time respondents to the QLFS and employed. We exclude full-time students. Source: QLFS, from Q1 2016 to Q4 2018. Data are weighted with the income weights provided in the QLFS.

US DATA

Figures for the US come from <https://www.bls.gov/cps/lfcharacteristics.htm#laborforce>. Data on characteristics of the labour force come from the Current Population Survey (CPS), for the population of employed individuals, 25 years and over. We classify Bachelor's degree holders as "First degree", individuals with advanced degrees as "Postgraduate degrees", and

any qualification lower than a Bachelor's degree as "No university degree". Figures refer to annual averages for 2018.

APPENDIX B: QUESTIONNAIRES

B1. Experience Questionnaire

Think about your life at university. To what extent do the following statements apply to you? You can select any number between 0 and 100.

- I enjoy the social life and activities I engage in.
- I meet people with whom I easily get along with.
- I have little contact with my family and friends from school.
- I sometimes feel lonely and not part of a group.
- I enjoy studying for my course.
- I find the material covered in my course interesting.
- I find the material too hard and/or the workload too high.
- I am stressed and sometimes feel that I cannot cope.
- I struggle financially.
- I have enough money to do what I enjoy.
- My parents supported me in my decision to go to university.
- Life at university is better than expected.

B2. Time Allocation

Now we would like to ask you how much time you spend on different activities. Think about last week and consider which activities you engaged in. If last week was not a typical week (e.g. because of sickness) please think of a typical week during term time. How many hours did you spend on the following activities? (enter hours per week)

- Attending lectures/seminars/tutorials
- Studying/preparing for lectures and exams
- Participating in student societies
- Socialising with friends
- Work/internship (for pay)
- Work/internship (not for pay)

[If working at least 1 hour per week, either for pay or not for pay] To what extent do the following statements apply to you?

- The work I do alongside my studies is closely related to the subject I study.
- The work I do alongside my studies will help me in my future career.

Think about the last summer break. How many weeks did you engage in work / internships?

[If worked at least one week] On a scale from 0 to 100, how related was this job to your studies?

[If worked at least one week] Did your parents know your employer or somebody working for the same employer?

[If worked at least one week] Did your parents help you write your application?

B3. Finances

Now we would like to ask you some questions about your current expenses and how you finance your undergraduate studies.

Did you take out a loan to finance your tuition fees? [Yes, No]

[If 'No' selected] How do you finance your tuition fees? (select all which apply)

- Money from parents/family
- Work alongside my studies
- Savings
- Other sources

In a typical month during term time, how high are your living expenses (including rent)? [amounts in £]

Did you take out a loan to finance your living expenses? [Yes, No]

B4. Plans for the Future

How likely do you think it is that you will complete your undergraduate degree?

Assuming that you complete your undergraduate degree, how likely do you think it is you will get a First?

Assuming that you get the necessary grades, how likely do you think it is you will enrol in a postgraduate degree?

If you enrol in a postgraduate degree, how likely do you think it is you will graduate?

Which field of study would you be most likely to choose?

B5. Hypothetical Scenarios

Now we would like you to think about the 1-2 years of your life that will come after you complete your undergraduate degree. Imagine that during these 1-2 years you enrol in your most preferred postgraduate degree. What do you think your life during these 1-2 years will be like? If you enrol in your preferred postgraduate degree, how likely do you think it is that you will...

- ...enjoy your social life?
- ...enjoy studying for your course?
- ...feel stressed?
- ...struggle financially?
- ...have parental support in your choice?
- ...work alongside your studies?

How high do you think the tuition fees for your course would be per year?

Now imagine that during the 1-2 years after you complete your undergraduate degree you do not enrol in a postgraduate degree but start working instead. What do you think your life during these 1-2 years will be like? If you start working, how likely do you think it is that you will...

- ...enjoy your social life?
- ...enjoy the work you will be doing?
- ...feel stressed?
- ...struggle financially?
- ...have parental support in your choice?

If you do not enrol in a postgraduate degree but start working instead, what do you think your pre-tax annual earnings would be during those 1-2 years? [in £]

Now we would like you to think about your life at age 35. Imagine that your highest qualification is a postgraduate degree in your preferred field of study. How likely do you think it is that you will...

- ...be working full-time?
- ...be satisfied with your professional career?
- ...have a high status in society?
- ...have a career in which you can contribute to society?
- ...have a good work-life balance?
- ...have children?

Assuming that you work full-time, what do you think your pre-tax annual earnings would be at age 35 if your highest qualification is a postgraduate degree in your preferred field of study? [in £]

Now we would like you to think about your life at age 35. Imagine that your highest qualification is an undergraduate degree in your current field of study. How likely do you think it is that you will...

- ...be working full-time?
- ...be satisfied with your professional career?
- ...have a high status in society?
- ...have a career in which you can contribute to society?
- ...have a good work-life balance?
- ...have children?

Assuming that you work full-time, what do you think your pre-tax annual earnings would be at age 35 if your highest qualification is an undergraduate degree in your current field of study? [in £]

APPENDIX C: SUPPLEMENTARY ANALYSES

Table C.1—: Distribution of students across regions in England (%)

Region	Sample	National
East of England	6.89	6.69
East Midlands	10.08	9.90
London	17.96	17.86
North East	5.69	5.74
North West	13.47	13.53
South East	14.07	14.17
South West	9.88	10.01
West Midlands	10.78	10.86
Yorkshire and The Humber	11.18	11.24

Notes: National figures come from the Higher Education Statistics Agency (HESA) and refer to the percentage of all students enrolled full-time in a first degree or other undergraduate degree in England. Data source: Higher Education Statistics Agency (2019a).

Table C.2—: Summary statistics

	Mean	St. Dev.	N
First generation	0.500	0.500	1002
Female	0.496	0.500	1002
Parent with postgraduate degree	0.164	0.370	1002
Age	19.909	1.692	1002
Year	1.947	0.902	1002
Russell Group	0.386	0.487	976
Private school	0.141	0.348	1001
Hometown	0.184	0.387	1002

Notes: First-generation students are defined as those whose parents do not have a university degree. Parent with postgraduate degree is a binary variable equal to one if either parent obtained a postgraduate degree. Year is the year of undergraduate course respondents are currently attending. Russell Group is a binary variable indicating whether the university currently attended by the respondent is part of the Russell Group.

Table C.3—: Distribution of students across subject disciplines

Subject category	% All	% First	% Cont.	% Female	% Male	% Enroll postgr.
Medicine and Dentistry	5.21	4.01	6.41	5.45	4.97	33.92
Subjects allied to Medicine	6.71	7.41	6.01	10.71	2.78	49.42
Biological Sciences	13.23	13.03	13.43	17.37	9.15	57.77
Veterinary Science	0.90	0.80	1.00	1.41	0.40	19.00
Agriculture and Related Subjects	0.60	0.60	0.60	0.81	0.40	40.33
Physical Sciences	5.31	4.81	5.81	3.23	7.36	57.94
Mathematical Sciences	4.01	4.41	3.61	3.43	4.57	51.45
Computer Science	5.61	5.81	5.41	2.42	8.75	48.54
Engineering and Technology	8.22	8.02	8.42	2.42	13.92	50.29
Architecture	1.60	1.40	1.80	1.62	1.59	48.62
Social Studies	11.32	12.42	10.22	12.73	9.94	48.93
Law	4.71	6.21	3.21	5.05	4.37	51.72
Business and Administrative Studies	10.22	9.62	10.82	7.27	13.12	47.60
Mass Communications and Documentation	1.60	2.00	1.20	1.21	1.99	54.06
Languages	3.51	3.61	3.41	4.24	2.78	43.34
Historical and Philosophical Studies	4.91	4.21	5.61	4.85	4.97	49.00
Creative Arts and Design	8.92	8.02	9.82	11.11	6.76	46.11
Education	3.41	3.61	3.21	4.65	2.19	48.44
Observations	998	499	499	495	503	997

Notes: Subject categories refer to JACS 3.0 Principal subject codes. Column 1 reports the distribution of students in our sample across subjects. Columns 2 and 3 report the distribution for first- and continuing-generation students, respectively. Columns 4 and 5 report the distribution separately for female and male respondents. P-value for a Pearson's test of equality of distribution across SES is 0.656. P-value for a Pearson's test of equality of distribution across gender is 0.000. Column 6 reports the average stated likelihood of continuing to postgraduate education, by subject field.

Table C.4—: Differences in beliefs by school type - Continuing-generation students

Belief	All	School type			P-value	Cond. gap
		State	Private	Diff		
Enroll post-gr. degree	51.739 [30.204]	52.621 [30.751]	51.505 [30.105]	1.115 (3.206)	0.728	0.181 (3.770)
Complete undergr. degree	88.124 [14.790]	88.276 [13.507]	88.068 [15.190]	0.208 (1.570)	0.895	0.267 (1.614)
Get a First	56.691 [21.502]	58.026 [22.334]	56.302 [21.285]	1.724 (2.281)	0.450	1.720 (2.634)
Graduate (post-gr.)	76.606 [22.444]	77.877 [21.111]	76.353 [22.734]	1.524 (2.388)	0.524	0.514 (2.957)
Observations	500	384	116			

Notes: Standard deviations given in square brackets, standard errors given in round brackets. The sample is restricted to continuing generation students only. This table separately provides mean beliefs for the whole sample (Column 1), by whether the student attended a private or state school (Columns 2 and 3), the unconditional difference in beliefs between the two groups (Column 4), and the conditional difference in beliefs (Column 6). Column 2 refers to students who attended a state school, whilst Column 3 refers to students who attended a private school. P-values for a test of difference in means are provided in Column 5. The conditional gaps refer to the coefficients of a dummy variable for whether the student went to a private school, and is estimated in an OLS regression where each belief variable is regressed on the high school type dummy, a gender dummy, age of the respondent, and university and subject fixed effects.

Table C.5—: Mean beliefs for immediate and later-life outcomes by parental education - Continuing-generation students

Belief	All			No postgr. qual.			Postgrad. qual.			Diff-in-diff
	Undergr	Postgr	Diff	Undergr	Postgr	Diff	Undergr	Postgr	Diff	
<i>Panel A: Immediate Outcomes</i>										
Enjoy social life	64.345 [20.427]	61.916 [20.296]	-2.429 0.020	64.169 [19.650]	61.350 [19.663]	-2.819 0.017	64.707 [21.997]	63.079 [21.553]	-1.628 0.438	-1.191 (2.224)
Enjoy study / work	63.920 [21.181]	70.204 [19.866]	6.284 0.000	63.958 [20.692]	69.193 [20.188]	5.235 0.000	63.841 [22.213]	72.274 [19.083]	8.433 0.000	-3.198 (2.477)
Feel stressed	62.744 [22.182]	72.488 [21.335]	9.744 0.000	62.747 [21.189]	72.318 [20.233]	9.571 0.000	62.738 [24.156]	72.835 [23.493]	10.098 0.000	-0.526 (2.414)
Struggle financially	44.090 [26.348]	58.687 [25.829]	14.596 0.000	46.039 [25.892]	59.734 [24.113]	13.695 0.000	40.122 [26.900]	56.555 [28.976]	16.433 0.000	-2.738 (2.791)
Parental support	79.510 [22.735]	81.484 [21.700]	1.974 0.048	80.363 [21.285]	78.720 [22.540]	-1.643 0.157	77.762 [25.431]	87.146 [18.690]	9.384 0.000	-11.027*** (2.063)
Immediate cost	0.000 [.]	37539.122 [13331.214]	37539.122 0.000	0.000 [.]	37461.654 [13171.379]	37461.654 0.000	0.000 [.]	37697.837 [13692.327]	37697.837 0.000	-236.182 (1271.112)
<i>Panel B: Later-Life Outcomes</i>										
Earnings	43399.876 [17185.267]	50618.122 [17629.888]	7218.246 0.000	43428.601 [18194.990]	50029.062 [18023.244]	6600.461 0.000	43341.024 [14957.241]	51824.976 [16784.397]	8483.951 0.000	-1883.490* (1061.281)
Work full-time	82.994 [17.502]	85.096 [16.884]	2.102 0.000	81.831 [17.964]	83.267 [17.971]	1.436 0.027	85.384 [16.306]	88.854 [13.697]	3.470 0.002	-2.033* (1.197)
Satisfied with career	68.870 [18.396]	74.092 [16.610]	5.222 0.000	68.872 [17.756]	73.276 [16.937]	4.404 0.000	68.866 [19.703]	75.768 [15.834]	6.902 0.000	-2.499 (1.585)
High status	55.958 [23.686]	61.257 [23.233]	5.299 0.000	57.172 [23.031]	61.139 [23.258]	3.967 0.000	53.463 [24.865]	61.500 [23.250]	8.037 0.000	-4.069*** (1.560)
Contribution	65.491 [21.981]	72.798 [20.606]	7.307 0.000	66.068 [21.359]	72.665 [20.725]	6.596 0.000	64.305 [23.228]	73.073 [20.419]	8.768 0.000	-2.172 (1.642)
Work-life balance	64.876 [19.663]	63.703 [20.769]	-1.174 0.144	65.033 [18.904]	63.588 [20.381]	-1.445 0.127	64.555 [21.195]	63.939 [21.606]	-0.616 0.681	-0.829 (1.710)
Children	61.998 [30.262]	61.100 [29.616]	-0.898 0.134	62.926 [28.523]	61.955 [28.371]	-0.970 0.202	60.091 [33.565]	59.341 [32.041]	-0.750 0.433	-0.220 (1.275)

Notes: Standard deviations given in square brackets, standard errors given in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The sample is restricted to continuing-generation students. This table provides mean beliefs for the whole subsample and by the education level of the respondent's parents. Columns 1-3 provide results for the whole sample. Columns 4-6 are for respondents for whom neither parent holds a postgraduate degree, while Columns 7-9 are for respondents for whom at least one parent holds a postgraduate qualification. Within each group, the first two columns give mean beliefs for the respective characteristic under the scenarios of having an undergraduate or postgraduate degree as the highest qualification, respectively. Mean beliefs are given on a 0-100 scale other than for expected earnings and immediate costs, which are in pounds. The third column gives the mean difference between these two beliefs, with the p-value from a t-test of difference in means reported underneath. Column 10 ('Diff-in-diff') gives the average difference for respondents for whom neither parent has a postgraduate degree minus the average difference for respondents for whom at least one parent has a postgraduate degree.

Table C.6—: Mean beliefs for immediate and later-life outcomes by school type - Continuing-generation students

Belief	All			Private school			State school			Diff-in-diff
	Undergr	Postgr	Diff	Undergr	Postgr	Diff	Undergr	Postgr	Diff	
<i>Panel A: Immediate Outcomes</i>										
Enjoy social life	64.345 [20.427]	61.916 [20.296]	-2.429 0.020	66.862 [19.400]	63.422 [17.812]	-3.440 0.079	63.630 [20.701]	61.466 [21.014]	-2.164 0.079	-1.276 (2.476)
Enjoy study / work	63.920 [21.181]	70.204 [19.866]	6.284 0.000	64.948 [18.788]	69.931 [16.244]	4.983 0.018	63.601 [21.893]	70.285 [20.882]	6.684 0.000	-1.701 (2.762)
Feel stressed	62.744 [22.182]	72.488 [21.335]	9.744 0.000	64.017 [21.566]	72.612 [19.488]	8.595 0.000	62.368 [22.406]	72.520 [21.873]	10.151 0.000	-1.557 (2.686)
Struggle financially	44.090 [26.348]	58.687 [25.829]	14.596 0.000	45.617 [26.186]	54.626 [25.945]	9.009 0.001	43.632 [26.414]	59.906 [25.703]	16.274 0.000	-7.265** (3.099)
Parental support	79.510 [22.735]	81.484 [21.700]	1.974 0.048	76.879 [21.874]	81.078 [19.113]	4.198 0.059	80.402 [22.908]	81.608 [22.473]	1.206 0.278	2.992 (2.352)
Immediate cost	0.000 [.]	37539.122 [13331.214]	37539.122 0.000	0.000 [.]	40597.036 [13761.851]	40597.036 0.000	0.000 [.]	36561.227 [13050.407]	36561.227 0.000	4035.809*** (1400.883)
<i>Panel B: Later-Life Outcomes</i>										
Earnings	43399.876 [17185.267]	50618.122 [17629.888]	7218.246 0.000	47452.802 [17688.674]	56564.267 [17520.379]	9111.466 0.000	42092.799 [16806.633]	48759.856 [17266.660]	6667.057 0.000	2444.408** (1179.896)
Work full-time	82.994 [17.502]	85.096 [16.884]	2.102 0.000	82.284 [17.154]	84.319 [16.301]	2.034 0.104	83.234 [17.637]	85.307 [17.086]	2.073 0.001	-0.038 (1.335)
Satisfied with career	68.870 [18.396]	74.092 [16.610]	5.222 0.000	67.966 [16.378]	72.991 [14.777]	5.026 0.002	69.138 [18.998]	74.479 [17.115]	5.341 0.000	-0.315 (1.766)
High status	55.958 [23.686]	61.257 [23.233]	5.299 0.000	59.543 [22.541]	64.724 [20.894]	5.181 0.000	54.971 [23.904]	60.341 [23.717]	5.370 0.000	-0.189 (1.748)
Contribution	65.491 [21.981]	72.798 [20.606]	7.307 0.000	66.526 [19.782]	73.034 [17.720]	6.509 0.000	65.294 [22.532]	72.831 [21.352]	7.536 0.000	-1.028 (1.832)
Work-life balance	64.876 [19.663]	63.703 [20.769]	-1.174 0.144	63.845 [19.908]	62.431 [20.403]	-1.414 0.338	65.180 [19.630]	64.078 [20.916]	-1.102 0.246	-0.312 (1.905)
Children	61.998 [30.262]	61.100 [29.616]	-0.898 0.134	59.828 [30.839]	59.060 [29.893]	-0.767 0.499	62.690 [30.126]	61.784 [29.550]	-0.906 0.197	0.139 (1.419)

Notes: Standard deviations given in square brackets, standard errors given in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. This table provides mean beliefs for the whole sample and by whether or not the student attended a private school. The sample is restricted to continuing-generation students only. Columns 1-3 provide results for the whole sample. Columns 4-6 are for respondents who attended a private school, while Columns 7-9 are for respondents who attended a state school. Within each group, the first two columns give mean beliefs for the respective characteristic under the scenarios of having an undergraduate or postgraduate degree as highest qualification respectively. Mean beliefs are given on a 0-100 scale other than for expected earnings and immediate costs, which are in pounds. The third column gives the mean difference between these two beliefs, with the p-value for a t-test of difference in means reported underneath. Column 10 ('Diff-in-diff') gives the average difference for respondents who attended a private school minus the average difference for respondents who attended a state school.

Table C.7—: Spearman rank correlation coefficients

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
(1) Expected earnings	1.00													
(2) Enjoy social life	0.04	1.00												
(3) Enjoy study / work	0.12	0.38	1.00											
(4) Feel stressed	0.04	-0.26	-0.11	1.00										
(5) Struggle financially	0.01	-0.19	-0.05	0.28	1.00									
(6) Parental support	0.09	0.17	0.23	0.00	-0.03	1.00								
(7) Immediate costs	0.00	0.04	-0.15	-0.13	-0.10	-0.05	1.00							
(8) Work full-time	0.09	-0.01	0.01	0.02	-0.04	0.04	-0.03	1.00						
(9) Satisfied with career	0.26	0.01	0.19	0.02	0.03	0.12	-0.10	0.21	1.00					
(10) High status	0.32	0.01	0.07	0.05	0.02	0.07	-0.07	0.14	0.34	1.00				
(11) Contribute to society	0.24	0.04	0.18	0.03	0.06	0.12	-0.16	0.13	0.35	0.35	1.00			
(12) Work-life balance	0.09	0.13	0.14	-0.07	-0.04	0.08	0.00	0.12	0.12	0.07	0.10	1.00		
(13) Have children	0.07	0.09	0.11	-0.06	-0.01	0.03	-0.00	0.08	0.17	0.10	0.16	0.22	1.00	
(14) Postgraduate graduation	0.13	0.13	0.24	0.03	0.05	0.06	0.06	-0.01	0.06	0.07	0.04	0.11	0.03	1.00

Notes: This table displays the Spearman rank correlations between the perceived returns to postgraduate education relative to the scenario where the highest educational qualification attained is an undergraduate degree.

GRADUATE EDUCATION

Table C.8—: Removing outliers

	All		First generation		Continuing generation		Difference (p-value)	
	Coef.	WTP	Coef.	WTP	Coef.	WTP	Coef.	WTP
Expected earnings at age 35 ($10000\gamma_y$)	0.250*** (0.076)		0.063 (0.116)		0.346*** (0.104)		0.068	
Enjoy social life (Δu_1)	0.710*** (0.207)	283.341** (122.134)	0.924*** (0.263)	1472.991 (2769.221)	0.595* (0.318)	171.775 (108.323)	0.425	0.638
Enjoy study / work (Δu_2)	1.085*** (0.212)	433.169*** (146.313)	0.730*** (0.265)	1163.730 (2129.063)	1.527*** (0.318)	441.316*** (151.732)	0.054	0.735
Feel stressed (Δu_3)	-0.257 (0.180)	-102.573 (78.512)	-0.127 (0.244)	-202.838 (534.030)	-0.330 (0.276)	-95.299 (84.800)	0.582	0.842
Struggle financially (Δu_4)	-0.478*** (0.153)	-190.821** (85.771)	-0.517** (0.212)	-824.574 (1517.903)	-0.340 (0.226)	-98.212 (75.276)	0.567	0.632
Parental support (Δu_5)	1.169*** (0.216)	466.807*** (169.999)	1.280*** (0.304)	2041.164 (3862.326)	0.981*** (0.325)	283.528** (125.977)	0.501	0.649
Immediate cost ($10000\gamma_c$)	-0.066** (0.026)	-0.264** (0.129)	-0.114*** (0.039)	-1.810 (3.398)	-0.003 (0.036)	-0.008 (0.105)	0.037	0.596
Work full time at age 35 (Δu_6)	-0.377 (0.702)	-150.543 (281.507)	-1.270 (1.004)	-2024.732 (4105.360)	0.809 (0.937)	233.821 (287.884)	0.130	0.583
Satisfied with career at age 35 (Δu_7)	0.890 (0.589)	355.193 (265.707)	0.368 (0.846)	587.438 (1803.706)	1.503* (0.843)	434.141 (282.275)	0.342	0.933
High status at age 35 (Δu_8)	0.868 (0.629)	346.434 (291.042)	0.592 (0.954)	943.985 (2512.298)	0.988 (0.846)	285.523 (277.003)	0.756	0.794
Contribute to society at age 35 (Δu_9)	0.339 (0.620)	135.538 (256.530)	1.011 (0.864)	1611.104 (3342.898)	-0.433 (0.906)	-125.137 (257.154)	0.249	0.604
Work-life balance at age 35 (Δu_{10})	1.037* (0.586)	414.005 (271.445)	1.438* (0.798)	2292.543 (4652.575)	0.669 (0.837)	193.218 (244.878)	0.506	0.652
Have children at age 35 (Δu_{11})	1.077 (0.704)	430.108 (314.663)	1.520 (0.936)	2423.725 (4779.069)	0.585 (1.012)	169.093 (300.056)	0.497	0.638
Postgraduate graduation probability	0.292** (0.142)	116.617 (71.084)	0.605*** (0.194)	963.928 (1855.570)	-0.093 (0.208)	-26.947 (59.430)	0.014	0.593
Observations	823	823	404	404	419	419		
Variance explained	0.233		0.263		0.225			

Notes: Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Column 1 presents the estimates of the choice model for the whole sample, while column 2 presents the willingness-to-pay calculations. Columns 3-4 present the results for first-generation students, while columns 5-6 present the results for continuing-generation students. For the willingness to pay calculations, standard errors are calculated using the delta method. Continuing-generation students are defined as those students who have at least one parent with a university education.

Table C.9—: Removing respondents from non-English institutions

	All		First generation		Continuing generation		Difference (p-value)	
	Coef.	WTP	Coef.	WTP	Coef.	WTP	Coef.	WTP
Expected earnings at age 35 ($10000\gamma_y$)	0.223*** (0.070)		0.103 (0.098)		0.326*** (0.102)		0.115	
Enjoy social life (Δu_1)	0.499*** (0.191)	223.881* (114.599)	0.805*** (0.234)	781.624 (792.320)	0.217 (0.302)	66.681 (96.937)	0.124	0.370
Enjoy study / work (Δu_2)	1.139*** (0.186)	510.765*** (175.660)	0.880*** (0.243)	854.367 (813.043)	1.583*** (0.276)	485.732*** (172.223)	0.055	0.657
Feel stressed (Δu_3)	-0.299* (0.157)	-134.276* (80.335)	-0.460** (0.221)	-446.586 (463.300)	-0.180 (0.241)	-55.081 (75.461)	0.391	0.404
Struggle financially (Δu_4)	-0.440*** (0.143)	-197.555** (89.656)	-0.283 (0.199)	-275.129 (310.628)	-0.486** (0.207)	-149.197* (81.464)	0.479	0.695
Parental support (Δu_5)	1.031*** (0.187)	462.312*** (167.059)	0.914*** (0.247)	887.454 (892.371)	1.090*** (0.291)	334.443** (133.620)	0.645	0.540
Immediate cost ($10000\gamma_c$)	-0.091*** (0.025)	-0.408*** (0.151)	-0.119*** (0.033)	-1.159 (1.102)	-0.045 (0.038)	-0.139 (0.116)	0.142	0.357
Work full time at age 35 (Δu_6)	-0.842 (0.571)	-377.736 (283.090)	-2.062*** (0.737)	-2001.516 (2097.941)	0.499 (0.817)	153.188 (261.025)	0.020	0.308
Satisfied with career at age 35 (Δu_7)	1.302** (0.561)	584.252* (333.115)	0.910 (0.820)	883.538 (1267.357)	1.895*** (0.717)	581.227** (296.093)	0.366	0.816
High status at age 35 (Δu_8)	0.997** (0.494)	447.307 (290.377)	1.089 (0.702)	1057.591 (1315.249)	0.866 (0.725)	265.524 (258.788)	0.824	0.554
Contribute to society at age 35 (Δu_9)	-0.102 (0.499)	-45.550 (223.434)	0.763 (0.726)	740.445 (1046.584)	-0.918 (0.695)	-281.711 (224.679)	0.094	0.339
Work-life balance at age 35 (Δu_{10})	0.778* (0.469)	349.135 (242.206)	0.452 (0.643)	438.593 (781.885)	1.049 (0.639)	321.782 (221.833)	0.510	0.886
Have children at age 35 (Δu_{11})	1.108* (0.572)	497.240 (316.676)	0.199 (0.829)	193.200 (848.896)	1.671** (0.759)	512.568* (295.354)	0.190	0.722
Graduate postgr.	0.460*** (0.134)	206.298** (89.020)	0.628*** (0.172)	609.446 (605.535)	0.162 (0.207)	49.619 (65.624)	0.084	0.358
Observations	939	939	473	473	466	466		
Variance explained	0.269		0.282		0.284			

Notes: Standard errors in parentheses. * p<0.10, ** p<0.05, *** p<0.01. Column 1 presents the estimates of the choice model for the whole sample, while column 2 presents the willingness-to-pay calculations. Columns 3-4 present the results for first-generation students, while columns 5-6 present the results for continuing-generation students. For the willingness to pay calculations, standard errors are calculated using the delta method. Continuing-generation students are defined as those students who have at least one parent with a university education. The sample only includes students for whom we have information on the university currently attendend, and the university is in England.

Table C.10—: Removing respondents for whom the probability of completing undergraduate degree is below 50%

	All		First generation		Continuing generation		Difference (p-value)	
	Coef.	WTP	Coef.	WTP	Coef.	WTP	Coef.	WTP
Expected earnings at age 35 ($10000\gamma_y$)	0.180*** (0.067)		0.060 (0.095)		0.303*** (0.098)		0.075	
Enjoy social life (Δu_1)	0.458** (0.190)	254.529* (146.282)	0.735*** (0.239)	1229.670 (2010.709)	0.181 (0.296)	59.807 (101.233)	0.145	0.561
Enjoy study / work (Δu_2)	1.157*** (0.182)	643.463** (255.228)	0.929*** (0.238)	1552.941 (2435.645)	1.529*** (0.265)	504.849*** (183.413)	0.091	0.668
Feel stressed (Δu_3)	-0.270* (0.152)	-150.382 (98.671)	-0.362* (0.220)	-605.989 (983.543)	-0.220 (0.230)	-72.694 (79.652)	0.655	0.589
Struggle financially (Δu_4)	-0.521*** (0.136)	-289.418** (134.321)	-0.482** (0.193)	-806.341 (1297.543)	-0.461** (0.194)	-152.145* (84.326)	0.938	0.615
Parental support (Δu_5)	1.066*** (0.188)	592.480** (243.016)	0.886*** (0.247)	1482.150 (2401.990)	1.236*** (0.293)	407.933** (158.490)	0.362	0.655
Immediate cost ($10000\gamma_c$)	-0.074*** (0.024)	-0.409** (0.185)	-0.104*** (0.032)	-1.731 (2.757)	-0.024 (0.036)	-0.079 (0.116)	0.096	0.549
Work full time at age 35 (Δu_6)	-0.674 (0.562)	-374.812 (340.820)	-1.840** (0.753)	-3078.056 (5066.735)	0.512 (0.749)	168.883 (259.336)	0.027	0.522
Satisfied with career at age 35 (Δu_7)	1.327** (0.541)	737.929* (434.988)	0.897 (0.799)	1500.736 (2937.844)	1.941*** (0.691)	640.888** (319.783)	0.323	0.771
High status at age 35 (Δu_8)	1.080** (0.480)	600.373 (389.580)	1.153* (0.686)	1927.923 (3454.168)	0.888 (0.707)	293.331 (276.920)	0.788	0.637
Contribute to society at age 35 (Δu_9)	0.049 (0.491)	27.103 (273.922)	1.108 (0.720)	1853.524 (3239.311)	-0.887 (0.678)	-292.925 (233.717)	0.043	0.508
Work-life balance at age 35 (Δu_{10})	0.697 (0.458)	387.463 (295.740)	0.344 (0.630)	574.568 (1441.918)	1.027 (0.626)	339.180 (229.140)	0.441	0.872
Have children at age 35 (Δu_{11})	1.149** (0.570)	638.782 (417.456)	0.238 (0.838)	398.558 (1614.930)	1.775** (0.754)	586.181* (326.028)	0.173	0.909
Postgraduate graduation probability	0.403*** (0.129)	224.303** (113.090)	0.596*** (0.167)	996.600 (1623.118)	0.072 (0.197)	23.663 (65.460)	0.042	0.549
Observations	971	971	489	489	482	482		
Variance explained	0.268		0.282		0.283			

Notes: Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The sample is restricted to respondents for whom the self-reported probability of completing their undergraduate degree is 50% or above. Column 1 presents the estimates of the choice model for the whole sample, while column 2 presents the willingness-to-pay calculations. Columns 3-4 present the results for first-generation students, while columns 5-6 present the results for continuing-generation students. For the willingness to pay calculations, standard errors are calculated using the delta method. Continuing-generation students are defined as those students who have at least one parent with a university education.

Table C.11—: Differences in experiences by parental education

Experience	All		Parental background		P-value
	N		First	Continuing	
Enjoy social life	1002	67.918 (24.249)	65.002 (25.534)	70.834 (22.542)	0.000
Meet people	1001	68.563 (21.771)	67.389 (22.967)	69.740 (20.458)	0.088
Little contact	998	38.844 (29.091)	37.507 (29.407)	40.170 (28.742)	0.148
Feel lonely	998	47.203 (30.787)	45.325 (31.818)	49.074 (29.639)	0.054
Enjoy studying	1002	68.246 (22.153)	67.048 (23.149)	69.443 (21.064)	0.087
Material interesting	1002	70.107 (21.138)	68.651 (21.761)	71.563 (20.415)	0.029
Material too hard	999	47.974 (25.488)	47.643 (26.000)	48.304 (24.988)	0.682
Feel stressed	997	52.000 (28.406)	52.478 (29.207)	51.523 (27.605)	0.596
Struggle financially	998	43.794 (30.791)	45.284 (30.925)	42.297 (30.614)	0.126
Have enough money	1000	53.044 (27.367)	48.623 (27.270)	57.447 (26.772)	0.000
Parental support	1001	86.962 (20.468)	83.976 (23.452)	89.954 (16.447)	0.000
Life better than expected	999	59.934 (25.826)	57.752 (26.815)	62.112 (24.635)	0.008

Notes: Standard deviations given in parentheses. This table separately provides mean university experiences on a 0-100 scale for the whole sample (Column 2) and by whether at least one parent has a degree (Columns 3 and 4). Column 3 refers to first-generation students, while Column 4 refers to continuing-generation students. P-values for a test of difference in means are provided in Column 5. The number of observations is reported in Column 1.

Table C.12—: Differences in experiences by parental education - Continuing-generation students

Experience	N	Parental background			P-value
		All	No postgr.	Postgr.	
Enjoy social life	501	70.834 (22.542)	70.718 (22.520)	71.073 (22.655)	0.869
Meet people	500	69.740 (20.458)	69.493 (20.037)	70.252 (21.357)	0.698
Little contact	501	40.170 (28.742)	41.341 (28.177)	37.762 (29.812)	0.191
Feel lonely	500	49.074 (29.639)	50.286 (28.947)	46.591 (30.950)	0.191
Enjoy studying	501	69.443 (21.064)	69.662 (19.993)	68.994 (23.167)	0.740
Material interesting	501	71.563 (20.415)	72.030 (19.153)	70.604 (22.822)	0.464
Material too hard	500	48.304 (24.988)	49.350 (24.792)	46.141 (25.328)	0.179
Feel stressed	499	51.523 (27.605)	51.497 (27.159)	51.577 (28.585)	0.976
Struggle financially	498	42.297 (30.614)	44.863 (29.893)	37.025 (31.485)	0.007
Have enough money	501	57.447 (26.772)	58.359 (25.506)	55.573 (29.195)	0.275
Parental support	500	89.954 (16.447)	88.491 (17.144)	92.951 (14.512)	0.004
Life better than expected	500	62.112 (24.635)	64.509 (23.229)	57.201 (26.697)	0.002

Notes: Standard deviations given in parentheses. This table separately provides mean university experiences on a 0-100 scale for the subsample of continuing-generation students (Column 2) and by whether at least one parent has a postgraduate degree (Columns 3 and 4). Column 3 refers to students whose parents only have an undergraduate degree, while Column 4 refers to students for whom at least one parent has a postgraduate degree. P-values for a test of difference in means are provided in Column 5. The number of observations is reported in Column 1.

Table C.13—: Differences in time allocation by parental education

Time Allocation	N	Parental background			P-value
		All	First	Continuing	
Time lectures	956	11.768 (7.679)	12.283 (7.516)	11.271 (7.809)	0.042
Time studying	960	12.747 (10.509)	12.186 (10.372)	13.296 (10.623)	0.102
Time student societies	958	2.137 (3.464)	1.617 (3.099)	2.643 (3.720)	0.000
Time socialising with friends	955	10.234 (11.165)	10.537 (11.540)	9.936 (10.788)	0.406
Time work for pay	952	3.479 (6.520)	3.998 (7.046)	2.975 (5.929)	0.015
Time work not for pay	951	0.372 (1.697)	0.362 (1.793)	0.383 (1.599)	0.850
% Work for pay	952	0.335 (0.472)	0.318 (0.466)	0.352 (0.478)	0.263
% Work not for pay	951	0.078 (0.268)	0.057 (0.233)	0.098 (0.297)	0.020
Total time work	338	10.568 (7.547)	12.494 (7.052)	8.837 (7.576)	0.000
Work related to study	368	37.008 (34.585)	31.503 (35.208)	42.110 (33.283)	0.003
Work will help in future career	368	51.842 (32.083)	46.254 (32.954)	57.021 (30.434)	0.001
Summer: Number of weeks engaged in work	1001	4.287 (5.026)	4.579 (5.339)	3.994 (4.679)	0.066
Summer work: related to studies	563	36.197 (35.744)	31.727 (36.436)	40.033 (34.742)	0.006
Summer work: parents knew employer	567	0.280 (0.450)	0.225 (0.419)	0.328 (0.470)	0.007
Summer work: parents helped with application	567	0.150 (0.357)	0.103 (0.305)	0.190 (0.393)	0.004

Notes: Standard deviations given in parentheses. This table separately provides mean values for the time allocation variables for the whole sample (Column 1) and by whether at least one parent has a degree (Columns 2 and 3). Column 2 refers to first-generation students, while Column 3 refers to continuing-generation students. P-values for a test of difference in means are provided in Column 4.

Table C.14—: Differences in time allocation by parental education - Continuing-generation students

Time Allocation	Cont. gen.		Parental background		
	N		No postgr.	Postgr.	P-value
Time lectures	486	11.271 (7.809)	10.836 (7.960)	12.164 (7.436)	0.079
Time studying	485	13.296 (10.623)	13.742 (10.980)	12.373 (9.811)	0.184
Time student societies	485	2.643 (3.720)	2.701 (3.815)	2.522 (3.522)	0.621
Time socialising with friends	482	9.936 (10.788)	9.298 (11.153)	11.269 (9.883)	0.060
Time work for pay	483	2.975 (5.929)	2.933 (5.956)	3.064 (5.892)	0.820
Time work not for pay	481	0.383 (1.599)	0.308 (1.353)	0.538 (2.014)	0.139
% Work for pay	483	0.352 (0.478)	0.371 (0.484)	0.312 (0.465)	0.204
% Work not for pay	481	0.098 (0.297)	0.095 (0.294)	0.103 (0.304)	0.804
Total time work	178	8.837 (7.576)	8.645 (7.960)	9.246 (6.736)	0.623
Work related to study	191	42.110 (33.283)	45.539 (31.327)	35.143 (36.207)	0.042
Work will help in future career	191	57.021 (30.434)	59.016 (28.701)	52.968 (33.559)	0.197
Summer: Number of weeks engaged in work	500	3.994 (4.679)	3.958 (4.566)	4.067 (4.915)	0.808
Summer work: related to studies	303	40.033 (34.742)	41.609 (34.712)	36.635 (34.745)	0.247
Summer work: parents knew employer	305	0.328 (0.470)	0.349 (0.478)	0.281 (0.452)	0.241
Summer work: parents helped with application	305	0.190 (0.393)	0.220 (0.415)	0.125 (0.332)	0.050

Notes: Standard deviations given in parentheses. This table separately provides mean values for the time allocation variables for the sample of continuing-generation students (Column 1) and by whether at least one parent has a postgraduate degree (Columns 2 and 3). Column 2 refers to students whose parents do not have a postgraduate qualification, while Column 3 refers to students for whom at least one parent has a postgraduate degree. P-values for a test of difference in means are provided in Column 4.

Table C.15—: Differences in student finances by parental education

Finances	All		Parental background		
	N		First	Continuing	P-value
Loan for tuition fees	1002	0.883 (0.321)	0.948 (0.222)	0.818 (0.386)	0.000
Money from parents / family	117	0.769 (0.423)	0.500 (0.510)	0.846 (0.363)	0.000
Money from work	117	0.299 (0.460)	0.192 (0.402)	0.330 (0.473)	0.180
Savings	117	0.171 (0.378)	0.154 (0.368)	0.176 (0.383)	0.795
Other sources	117	0.179 (0.385)	0.308 (0.471)	0.143 (0.352)	0.054
Living expenses (£)	1001	600.100 (382.217)	552.200 (372.576)	647.904 (386.084)	0.000

Notes: Standard deviations given in parentheses. This table separately provides mean values of student finances for the whole sample (Column 1) and by whether at least one parent has a degree (Columns 2 and 3). Column 2 refers to first-generation students, while Column 3 refers to continuing-generation students. P-values for a test of difference in means are provided in Column 4.

Table C.16—: Differences in student finances by parental education - Continuing-generation Students

Finances	Cont. gen.		Parental background		
	N		No Postgr.	Postgr.	P-value
Loan for tuition fees	501	0.818 (0.386)	0.825 (0.381)	0.805 (0.398)	0.586
Money from parents / family	91	0.846 (0.363)	0.898 (0.305)	0.750 (0.440)	0.062
Money from work	91	0.330 (0.473)	0.441 (0.501)	0.125 (0.336)	0.002
Savings	91	0.176 (0.383)	0.186 (0.393)	0.156 (0.369)	0.722
Other sources	91	0.143 (0.352)	0.119 (0.326)	0.188 (0.397)	0.376
Living expenses (£)	501	647.904 (386.084)	646.291 (387.444)	651.220 (384.435)	0.893

Notes: Standard deviations given in parentheses. This table separately provides mean values of student finances for the sample of continuing-generation students (Column 1) and by whether at least one parent has a postgraduate degree (Columns 2 and 3). Column 2 refers to students whose parents do not have a postgraduate qualification, while Column 3 refers to students for whom at least one parent has a postgraduate degree. P-values for a test of difference in means are provided in Column 4.

Table C.17—: Determinants of perceived returns - Experience factors only

	Social life	Study / work	Stressed	Struggle	Parents
Social life	0.022** (0.009)	-0.006 (0.011)	0.030*** (0.010)	0.037*** (0.011)	0.008 (0.010)
Course material	0.012 (0.009)	0.059*** (0.010)	-0.020** (0.009)	-0.001 (0.011)	-0.003 (0.009)
Stress	-0.013 (0.008)	-0.012 (0.009)	0.026*** (0.009)	-0.003 (0.010)	0.003 (0.008)
Financial struggles	-0.003 (0.008)	0.009 (0.010)	-0.002 (0.009)	0.091*** (0.010)	0.001 (0.009)
Parental support	-0.019** (0.008)	-0.009 (0.009)	0.015* (0.009)	0.026*** (0.010)	0.024*** (0.009)
Life better than expected	0.032*** (0.010)	-0.006 (0.011)	-0.036*** (0.010)	-0.036*** (0.012)	-0.008 (0.010)
Observations	989	988	988	987	988
R Squared	0.052	0.047	0.038	0.102	0.012
University fixed effects	N	N	N	N	N
Subject fixed effects	N	N	N	N	N

Notes: Robust standard errors from OLS estimation in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. All dependent variables are beliefs about returns (postgraduate - work), see overview of elicited beliefs about returns in Table 1. The dependent variable is indicated in the column heading. Social life, course material, stress, and financial struggles refer to the first factor from the related variables.

Table C.18—: Observed and perceived returns to postgraduate education in terms of annual earnings

	UK HLS			Beliefs
	(1)	(2)	(3)	(4)
Postgr. degree	6,035.234*** (1,843.651)	6,502.273*** (1,995.256)	5,793.755*** (2,039.411)	7,218.246*** (499.577)
First gen. × Postgr. degree	-2,892.623 (2,205.555)	-3,540.619 (2,395.513)	-2,455.042 (2,418.948)	-1,496.442** (714.386)
First generation	-2,425.178* (1,406.900)	-1,423.901 (1,499.715)	-1,987.431 (1,505.234)	-3,052.030*** (1,085.339)
Female	-7,263.812*** (1,026.562)	-6,575.314*** (1,116.051)	-7,555.631*** (1,203.795)	-6,218.855*** (1,033.451)
Math		3,875.314*** (649.564)	3,756.193*** (653.698)	
Verbal		744.809 (533.393)	693.749 (546.249)	
Openness			-1,648.012** (644.721)	
Neuroticism			-793.877 (657.779)	
Extraversion			1,763.389*** (572.369)	
Conscientiousness			1,856.743*** (625.571)	
Agreeableness			-1,713.356*** (606.026)	
Constant	39,476.855*** (1,313.952)	36,664.770*** (1,463.530)	37,914.100*** (1,502.657)	46,471.991*** (894.828)
Observations	1,108	896	855	2,002
R-squared	0.086	0.132	0.162	0.074

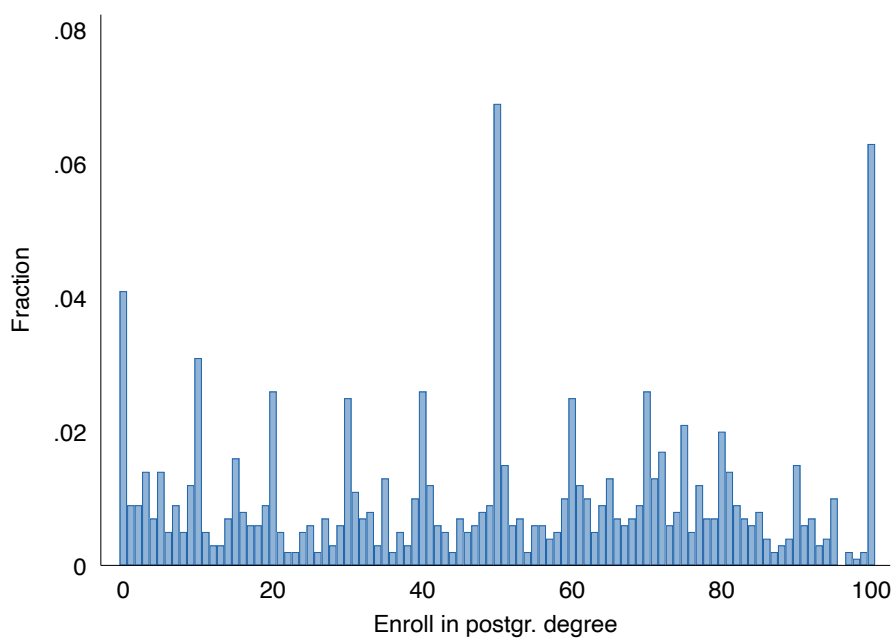
Notes: Columns (1) to (3) are estimated using waves 6-8 of the UK Household Longitudinal Study. The sample is restricted to individuals aged 32-38 with at least a first degree or equivalent and employed full time. The dependent variable is total gross annual labour earnings (averaged over the period of observation), for individuals who report strictly positive earnings. In all columns, we control for age distance from 35. The last column is estimated using our sample while taking each individual twice, once for each scenario. OLS estimation is used. Standard errors in parentheses, and clustered at the individual level in column 4. * p<0.10, ** p<0.05, *** p<0.01.

Table C.19—: Test of RE on beliefs about annual earnings at age 35

	Undergr. earnings		Postgr. earnings	
	N	P-value	N	P-value
First generation	1289	0.195	1037	0.470
Continuing generation	867	0.669	950	0.689

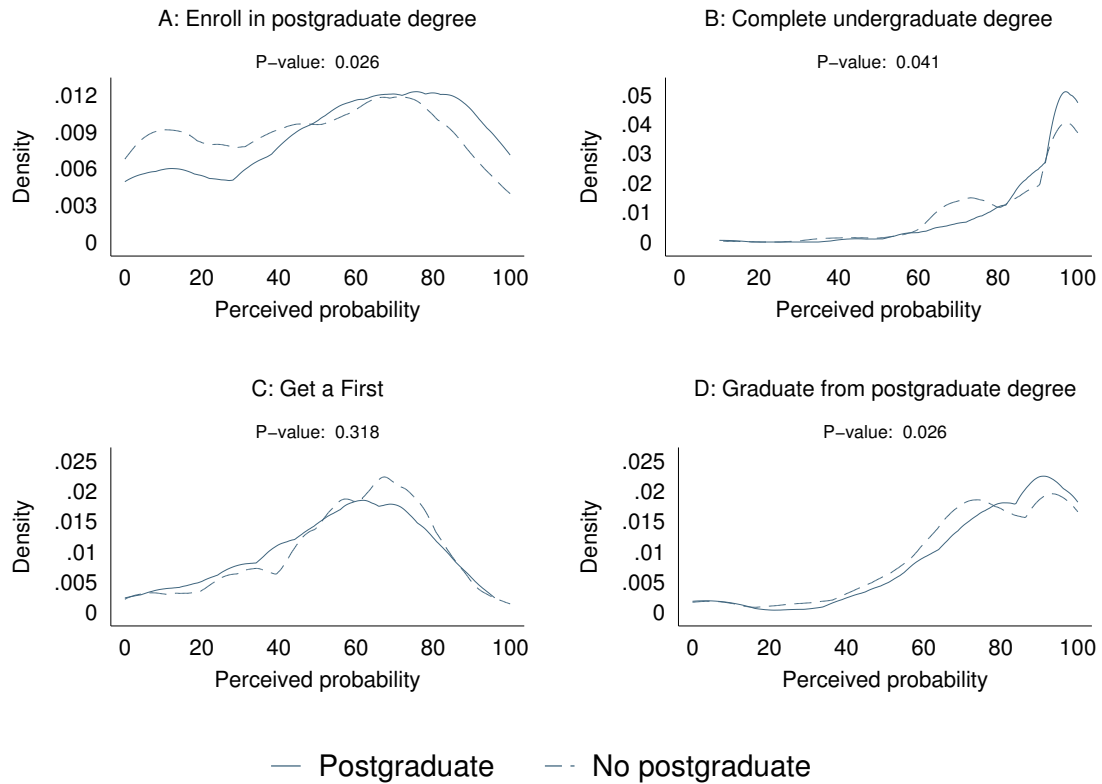
Notes: The table presents results from a test of RE with regards to beliefs about earnings at age 35 (d’Haultfoeuille, Gaillac and Maurel, 2018). Tests are conducted separately for the case where the highest educational qualification is an undergraduate or a postgraduate degree. Beliefs from the survey data are compared with realized earnings of respondents to waves 6-8 of the UKHLS who are aged 32-38, have achieved at least a first degree, report being in full-time employment and have positive earnings. Beliefs data are adjusted for real annual earnings growth, assumed at 1%. Columns (1) and (2) show results for beliefs about earnings for individuals with an undergraduate degree only. Columns (3) and (4) show equivalent results for beliefs about earnings for individuals who obtained a postgraduate degree. N refers to the number of observations, and p-values are for a test where the null hypothesis is that respondents have rational expectations. 2,000 bootstrap simulations are used to compute the critical values of the RE test.

Figure C.1. : Distribution of students' intentions to enroll in postgraduate education - Histogram



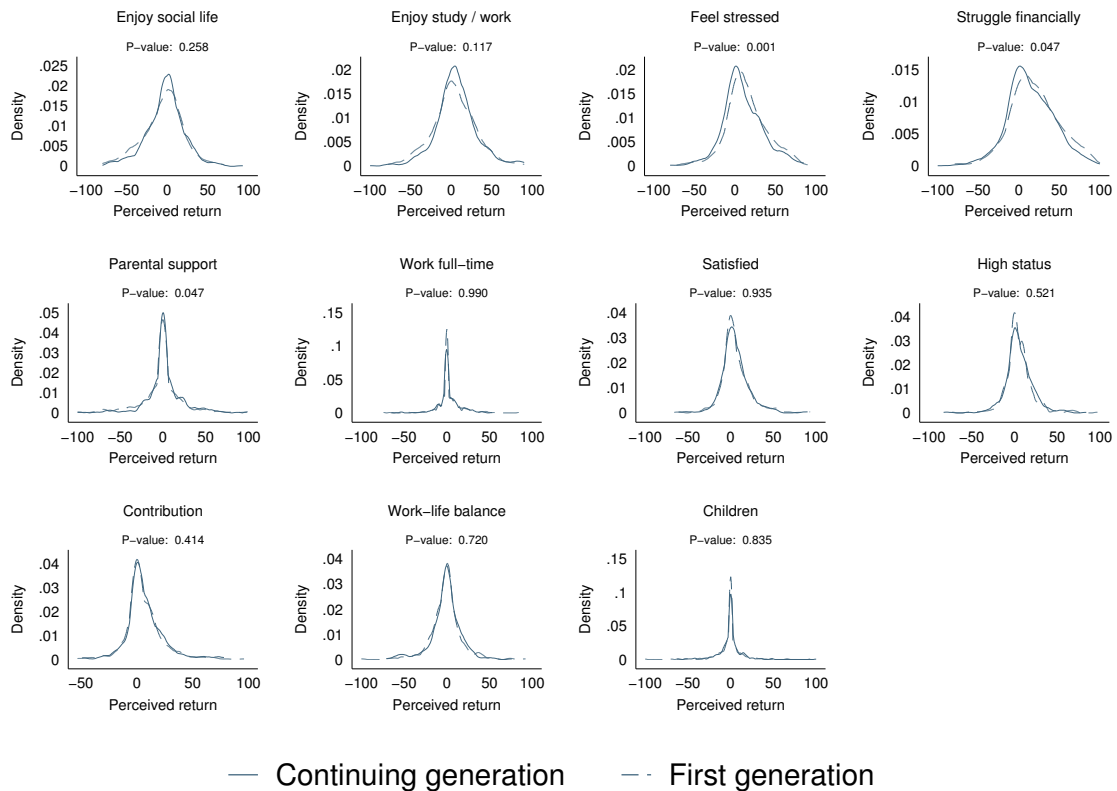
Notes: The figure depicts the histogram of individual beliefs about the likelihood of enrolling in a postgraduate degree for the full sample.

Figure C.2. : Differences in beliefs by parental education - Continuing-generation students



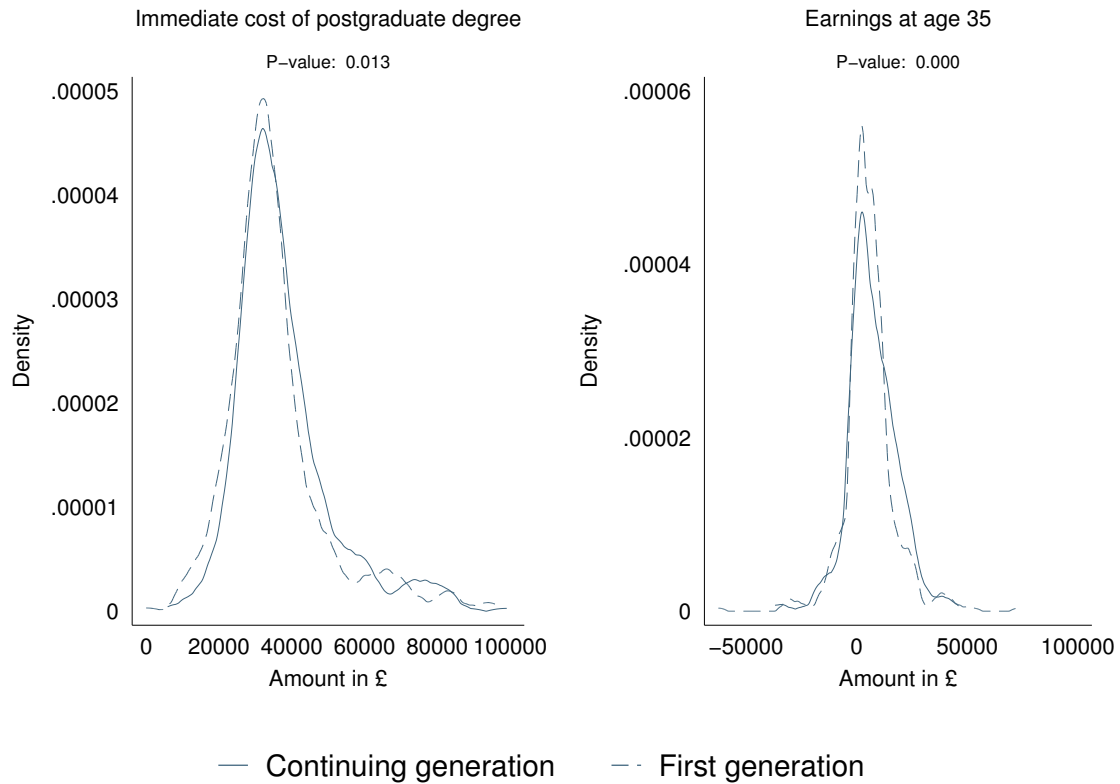
Notes: The different panels depict the kernel densities of individual beliefs about the likelihood of enrolling in a postgraduate degree (Panel A), graduating from their undergraduate degree (Panel B), getting a First in their undergraduate degree (Panel C), and graduating from their postgraduate degree (Panel D). The densities are depicted for students whose parents do not (dashed line) and do (solid line) hold a postgraduate qualification, respectively. The sample is restricted to continuing-generation students only. Reported p-values are from Kolmogorov-Smirnov tests of equality of distributions.

Figure C.3. : Distribution of perceived returns to postgraduate education by parental education



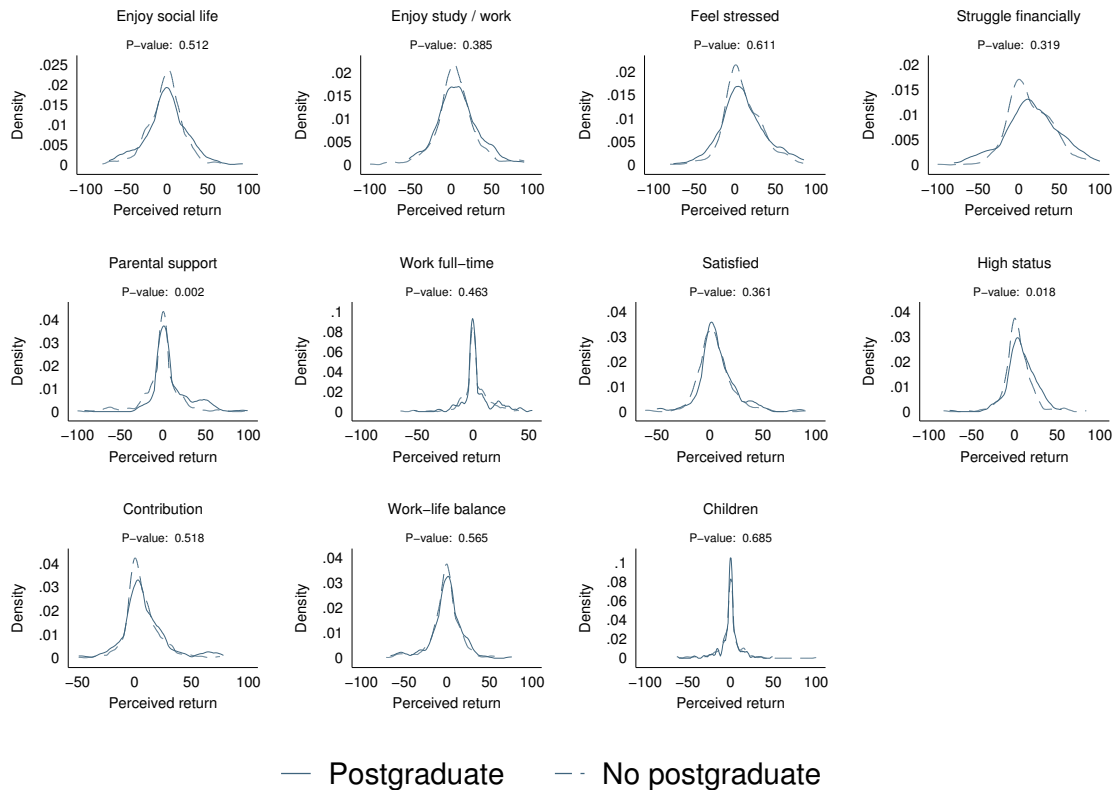
Notes: The different panels depict the kernel densities of individual beliefs about returns to postgraduate education in terms of the different binary outcomes 1-2 years after graduation and at age 35. The densities are depicted for first-generation students (dashed line) and continuing-generation students (solid line). Reported p-values are from Kolmogorov-Smirnov tests of equality of distributions.

Figure C.4. : Distribution of immediate costs and expected earnings by parental education



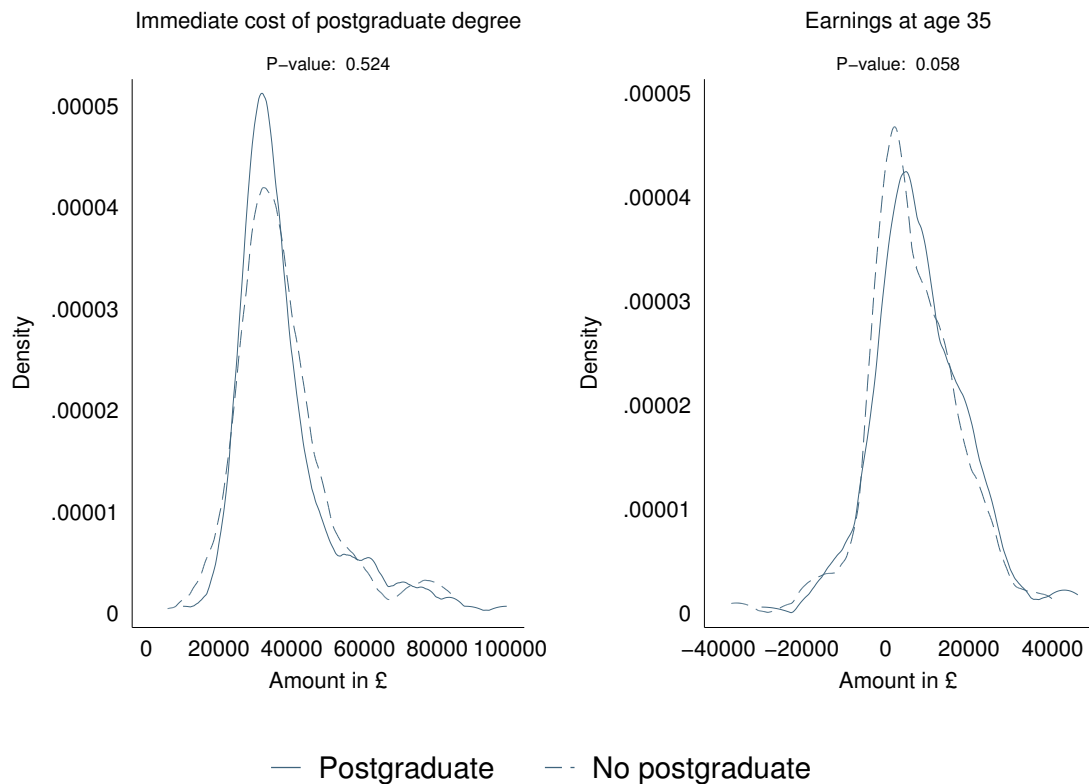
Notes: The two panels depict the kernel densities of individual beliefs about expected immediate costs of postgraduate education, calculated as the sum of expected tuition fees and forgone earnings in the 1-2 years after finishing the undergraduate degree, and expected earnings at age 35 conditional on working full-time. The densities are depicted separately for first-generation students (dashed line) and continuing-generation students (solid line). Reported p-values are from Kolmogorov-Smirnov tests of equality of distributions.

Figure C.5. : Distribution of perceived returns to postgraduate education by parental education - Continuing-generation students



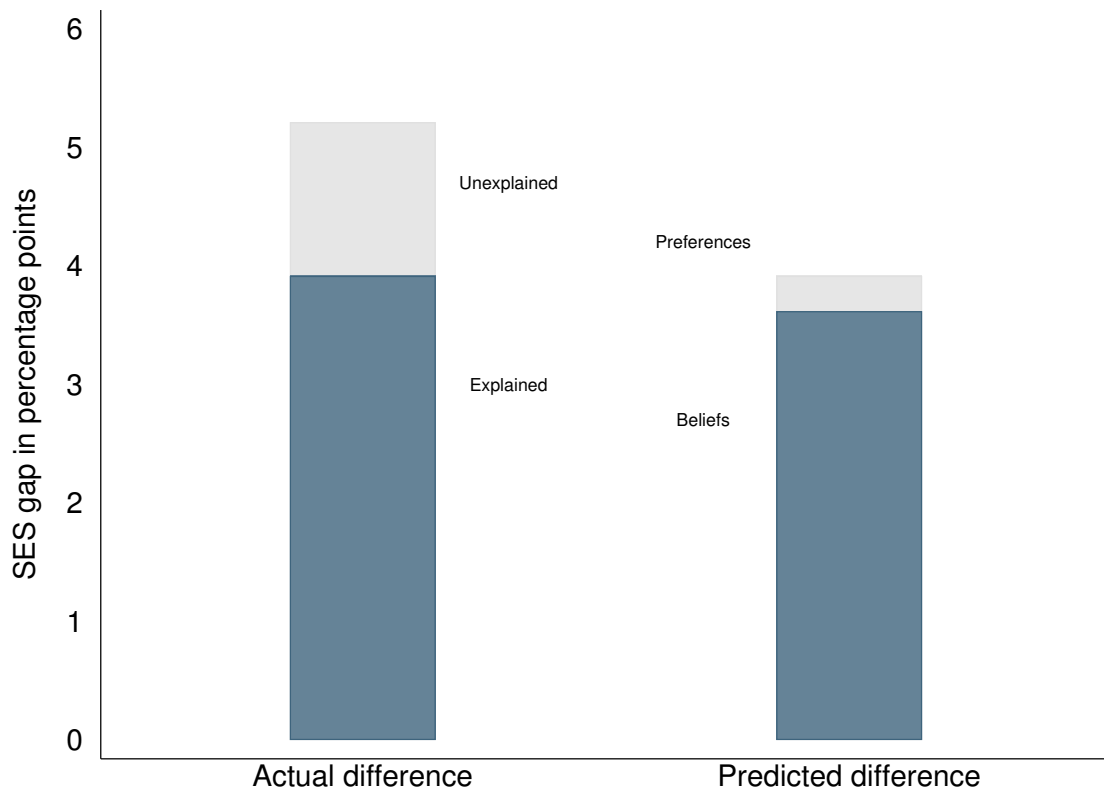
Notes: The different panels depict the kernel densities of individual beliefs about returns to postgraduate education in terms of the different binary outcomes 1-2 years after graduation and at age 35. The densities are depicted for continuing-generation students separated by whether their parents do (solid line) or do not (dashed line) hold a postgraduate qualification. The sample is restricted to continuing-generation. Reported p-values are from Kolmogorov-Smirnov tests of equality of distributions.

Figure C.6. : Distribution of immediate costs and expected earnings by parental education - Continuing-generation students



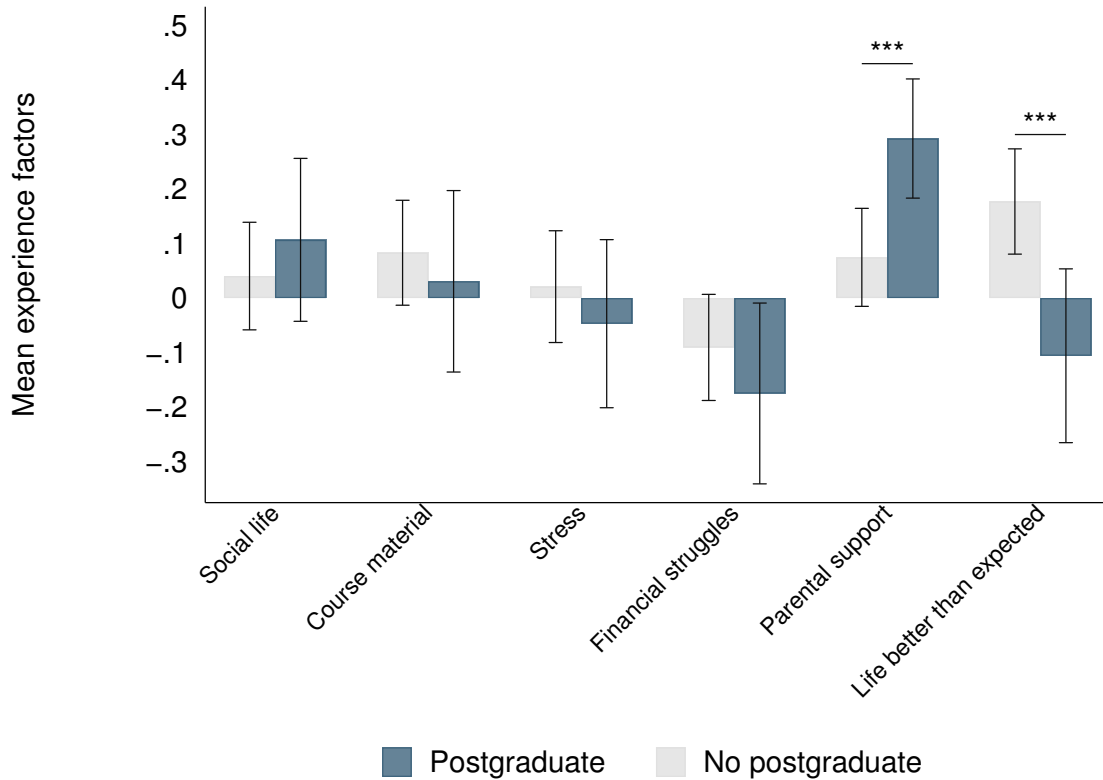
Notes: The two panels depict the kernel densities of individual beliefs about expected immediate costs of postgraduate education, calculated as the sum of expected tuition fees and forgone earnings in the 1-2 years after finishing the undergraduate degree, and expected earnings at age 35 conditional on working full-time. The densities are depicted for continuing-generation students separated by whether their parents do (solid line) or do not (dashed line) hold a postgraduate qualification. Reported p-values are from Kolmogorov-Smirnov tests of equality of distributions.

Figure C.7. : Decomposition of predicted SES gap in intentions to enroll



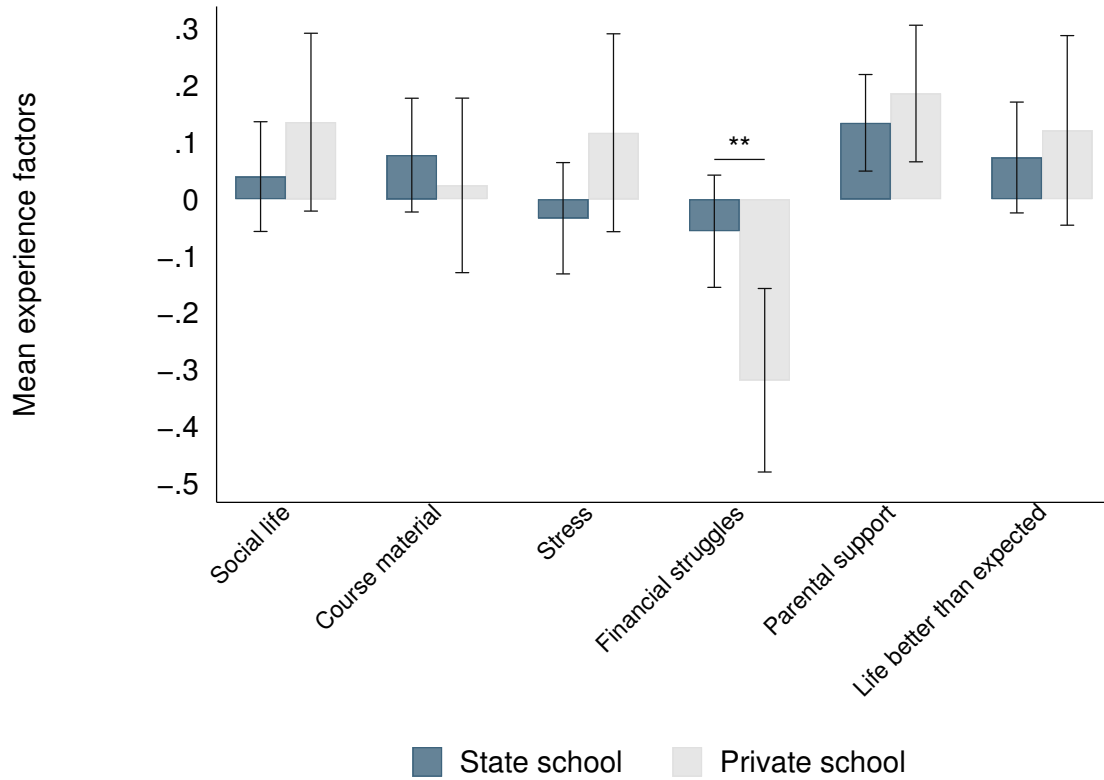
Notes: SES is split by whether at least one parent has university education. The first column decomposes the actual difference between low and high SES students' intention to enroll in a postgraduate degree into that which can be predicted by the model and that which is unexplained. The second column decomposes the predicted SES gap into differences in preferences and differences in beliefs.

Figure C.8. : Experience of life at university by parental education - Continuing-generation students



Notes: The figure shows the average value of the first factor from a factor analysis of the variables related to the social life, positive and negative aspects of the coursework and financial situation, as well as the standardized variables for having parental support and perceiving life at university as better than expected. The sample is restricted to continuing-generation students only, and students are divided according to whether their parents do (blue bars) or do not (gray bars) hold a postgraduate qualification. The black caps represent 95% confidence intervals and stars indicate statistical significance of differences by parental background: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Figure C.9. : Experience of life at university by school type - Continuing-gen. students



Notes: The figure shows the average value of the first factor from a factor analysis of the variables related to the social life, positive and negative aspects of the coursework and financial situation, as well as the standardized variables for having parental support and perceiving life at university as better than expected. The sample is restricted to continuing-generation students only. School type is split between students who attended a state school (blue bars) and those who attended a private school (gray bars). The black caps represent 95% confidence intervals and stars indicate statistical significance of differences by school type: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.