For Some, Luck Matters More: The Impact of the Great Recession on Early Careers of Graduates from Different Socio-Economic Backgrounds*

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Abstract

We exploit the variation in the labour demand caused by the Great Recession to investigate whether the first job destinations of graduates from different socio-economic backgrounds are differently affected by the business cycle. We do this by using the Destination of Leavers from Higher Education survey and the Labour Force Survey across the period 2003-12. We show that when the labour market is tight graduates from disadvantaged backgrounds are more likely to choose to study for a professional qualification (such as PGCSE); those who become active labour market participants have more trouble finding a job, and those who find employment experience lower job quality, as measured by hours of work and salary. We provide evidence of the importance of social capital in explaining these findings.

Keywords: job search, college graduates, cost of recessions

JEL Classification: E32, I23, J22, J23, J62, J64

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1 Introduction

Socio-economic background plays an important role in several aspects of life. The endowment of human and social capital helps to achieve a desirable status, while lack or scarcity of financial resources negatively affects the chances that one has in life. Education is one of the channels through which family background affects the level of well-being of new generations. Differences in opportunities emerge early. Sometimes they are already clearly evident in the pre-school and school years. As a result, education has an important role in trying to smooth the inter-generational transmission of (dis-)advantages and to promote social mobility. What is unclear is whether equalizing educational outcomes is enough to guarantee that people from different socio-economic backgrounds have the same labour market opportunities later on in life. Human capital theory mainly focuses on the socio-economic-status (SES) gradient on educational outcomes in the early years (Cunha and Heckman, 2010). The direct impact of family background on adult outcomes when conditioning on prior educational achievement is a topic much less explored (see Blanden et al. 2007 for an exception).

In this paper we analyse the relationship between family SES and the early labour market outcomes of several cohorts of students graduating from English universities. The first job plays a crucial role in one's life because it affects one's overall employment prospects (Gibbons and Waldman, 2004). Indeed, it has been found that the state of the business cycle at the time of graduation matters for early and long-term graduate careers (Kahn, 2010; Oreopoulos et al., 2012). Here we focus on the way in which SES background interacts with labour demand conditions at entry to determine the initial labour market destinations of new graduates. We exploit the change in labour demand due to the Great Recession to investigate whether graduates from different socio-economic backgrounds have been affected in different ways by the economic downturn. In other words, if luck matters - because those entering into the labour market in a recession are disadvantaged for no reason other than bad timing - does this affect graduates with different socio-economic opportunities in the same way?

In answering this question we want to understand the main reason why family SES is associated with the labour market outcomes of Higher Education graduates. One possible explanation is that

more advantaged families have higher endowments of financial resources and can therefore support their children through a more expensive job searching process, by, for example, favouring wider geographical mobility. Another factor frequently cited in the literature on social mobility is that higher SES individuals have access to wider and more effective social and professional networks, which facilitate the process of finding a job match. A period of high unemployment is expected to have negative consequences both in terms of financial resources and networks effectiveness. By studying how geographical mobility and social network effectiveness of students from different SES backgrounds are affected by higher unemployment at graduation, we provide new evidence on whether financial or social capital is the main factor driving the relationship between SES and adult outcomes.

Our empirical analysis is based on the UK Destination of Leavers from Higher Education (DLHE) survey. This survey contains a rich set of socio-demographic and labour market characteristics of students graduating from UK Higher Education Institutions between 2002/3 and 2011/2, and who were interviewed 6 months after graduation. We match this dataset with graduate unemployment rates (defined by field of study) in order to investigate the influence of the business cycle on early graduate careers. Our main focus is on labour market outcomes 6 months after graduation.

We show that middle SES and low SES graduates are always more disadvantaged as they suffer higher rates of unemployment compared to high SES graduates, and that this gap increases during the downturn. Graduates respond to graduating in bad times by staying longer in Higher Education, although individuals from more advantaged backgrounds choose academic courses, while graduates from more disadvantaged backgrounds choose professional courses that have more immediate returns in the labour market. High SES gradates also have an additional safety net when graduating in bad times: they fall back more on non-paid jobs/internships. These findings are robust when controlling for several observable individual characteristics - such as demographic composition, degree class, institutional time-invariant characteristics, and business cycle conditions at the time of enrolment. We further show that even among graduates who are in employment 6 months after graduation there are stark SES differences according to access to full-time positions, professional occupations, graduate jobs, and salary; these differences become more pronounced during the recession. When

looking at sub-groups, we find a significant degree of heterogeneity across subject studied. The recession has particularly increased the SES gradient among graduates in STEM subjects (i.e. Science, Technology, Engineering, and Mathematics).

The DLHE survey also offers information about the main channel graduates have used in order to find their job (internet search, university career service, personal and social contact, etc.) and their geographical mobility, as we have access to identifiers for area of residence before attending university and the postcode of the current employer. We exploit this information to analyse whether SES groups differ in the effectiveness of their networks, and in the degree of geographical mobility, and whether the economic downturn has accentuated these gaps. We find evidence that, during periods of higher unemployment, middle and low SES graduates are less likely to find a job through family and social contacts than their high SES counterparts. Among students who had no effective social networks, those disadvantaged found a job farther away from their original domicile than advantaged students. We interpret this as evidence that social capital is a key factor in understanding SES inequalities in graduate outcomes.

We finally provide evidence on the long-term effect of graduating in bad times and on the persistence of the SES gradient over time by looking at labour market outcomes at 3.5 years after graduation. There is also suggestive evidence on these negative outcomes affecting the well-being dimension through sentiments such as dissatisfaction of one's own career and regret for past choices. We find evidence of an SES gradient in these outcomes too.

Our paper is related to two broad areas of research. The first area is one which examines the effect of initial labour market conditions on the long term labour outcomes of college graduates. This literature finds that graduating when unemployment rates are high is very disruptive for college students' long-term careers. In some cases the effects are found to be very persistent (Kahn, 2010). Other evidence shows that an initial negative shock has long-term consequences but that these eventually fade out due to an increase in job mobility (Oreopoulos et al., 2012). A more recent study by Altonji et al. (2016) further indicates that the effects on earnings is partly explained by a reduction in hours worked (part-time vs. full-time) and that the Great Recession had a stronger negative impact on US graduates than previous downturns. Studies in European countries are also

in line with this evidence. For example, Liu et al. (2016) find a 3% rise in the unemployment rate at regional level implies a 30% increase in the probability of a job mismatch, defined in terms of field of study and industry worked, for college students in Norway. Cockx and Ghirelli (2016) find that a typical recession in Belgium implies wages and earnings penalties for high educated individuals. These penalties increase with experience, reaching a maximum ten years after labour market entry.

The second body of literature that we relate to is the literature on social mobility. A large part of intergenerational mobility studies focuses on the effect of socio-economic inequalities on educational outcomes, particularly early academic attainment. Only a few studies, mostly focused on the UK, have explored the existence of SES differences in labour market outcomes when conditioning on having a high level of education. Machin et al. (2009) look at differences in education attainment and labour market outcomes of graduates by gender, parental SES, state/private school status, ethnicity, and disability. They consider students graduating in 2002/3 at 6 months and 3.5 years after graduation. They find that after 6 months, graduates from managerial/professional backgrounds are most likely to be in full-time employment and that all groups earn significantly more than those with parents classified as unskilled workers. Private school students earn significantly more than any other student, and this gap increases after 3.5 years for both men and women (from 3.8% to 8.3% for males and from 7.3% to 12.1% for females). More recently Macmillan et al. (2015) investigate the socio-economic gradient with respect to accessing to top occupations. They consider UK first degree graduates leaving Higher Education in the year 2006/7. Even after controlling for a comprehensive set of variables representing human capital at graduation, they find that private school graduates are still 2.5 percentage points more likely to access top occupations 3.5 years after graduation.

None of the studies looking at the effect of "graduating at a bad time" considers whether the business cycle has a different impact on college students' outcomes according to family SES. At the same time, all the evidence about the association between SES and graduate labour market outcomes is based on a single cohort, and cannot take into account the impact of labour demand. In our analysis we focus on the socio-economic background of university students and on how this interacts with the macroeconomic conditions at graduation to determine labour market outcomes at

entry. Our idea is that changes in labour demand translate into changes in the social and financial capital of individual students and their families. By exploiting variation in the graduate SES gap over the business cycle we will thus try to understand the relative importance of social and financial capital in determining socio-economic differences in labour market outcomes after conditioning on human capital attainment.

The rest of the chapter is organized as follows. Section 2 explains the English educational system. Section 3 shows the empirical strategy and Section 4 presents the data and the main variables of interest. Section 5 goes through the main results. We then analyse the possible mechanisms underlying our findings in Section 6 and we conduct several robustness checks in Section 7. Finally, we look at some long-term outcomes in Section 8, and Section 9 concludes.

2 Institutional settings

Our analysis focuses on England. The rigidity of the educational system in this country makes it an ideal setting to investigate the role of the business cycle on graduate labour market outcomes. In England students typically enrol at university when they are 18 years old. To enrol in UK university, students who choose an academic track (leading to A-level qualifications) must formally apply through the Universities and Colleges Admissions Service (UCAS). The deadline for applying is usually in mid-January of the academic year before enrolment. In these applications, alongside their personal details and statement, students specify their ordered preferences for undergraduate courses and universities.

The choice of subject degree is conditional on the subjects and marks that students studied in the previous stage of education, called Key Stage 5 (KS5), when they are 16-18 years old. For example, for programmes with an important scientific content having studied maths is a necessary requirement, and it is also usually required to have achieved a particular mark, although this might differ across universities. For humanities subjects, having studied English language is often a must. In order to study particular subjects at Key Stage 5, students need to have achieved certain results

in relevant subjects in the previous stage of education, called Key Stage 4 (KS4).[1] For example, to study maths at KS5, most schools require students to have achieved the highest two marks in maths at KS4 (A*/A).

In other words, specialization into different subject areas occurs quite early on. Furthermore, at university, students enrol straight away into a specific programme: they do not decide what to study after having taken exams in the first year, unlike in other countries, such as in Scotland or the US. Switching course of study is costly, and not common in this system, and transfers between institutions are very rare (fewer than 3 percent switch institutions, Vignoles and Powdthavee 2009). On the other hand, dropouts from Higher Education is much less of a problem than in other countries.[2] Finally, a bachelor degree usually lasts for three years, and its duration is fixed because students cannot choose to give exams when they want, unlike in other European countries such as Italy.

The rigidity of the educational system makes England very appealing for studying our topic. This is because students do not have much, if any, scope to manipulate the choices made in Higher Education as a result of the state of the current business cycle.[3] The choice of degree studied is in most cases pre-determined several years before its actual realization, and changes between subjects and Higher Education institutions, as well as dropout rates, are negligible.

3 Empirical strategy

Our aim is to investigate whether graduating when macroeconomic conditions are bad has any effects on the labour market outcomes of graduates and whether the impact differs by socio-economic background. While the effect of graduating in bad times has already been investigated in other

[1] At Key Stage 4 students obtain a General Certificate of Secondary Education (GCSE) for each subject studied. Students have to study maths, English and science (although for this last subject they can choose several options) and then usually choose another 5/7 additional subjects.

[2] Vignoles and Powdthavee (2009) cites several statistics: the cohorts who started university in 2004/5, 91.6 percent of full-time students continued into their second year and "[...] HESA data indicate that the UK noncontinuation rate from the first year of study to the second for young, full-time entrants was 7.2 percent in 2004–2005. In the data for England, the figure is very similar (just over 6 percent)."

[3] Some studies have in fact shown how the business cycle affects degree choice (Blom et al., 2015) and duration of the degree (Cockx and Ghirelli, 2016) in those educational systems where discretion is allowed.

countries and periods, our focus on the variation by SES is novel. We use an identification strategy that is common to the papers cited towards the end of Section 1.

Our unit of analysis is a graduate i who obtained a degree in field of study f, from a Higher Education Institution (HEI) h and is observed at time t, i.e. 6 months after graduation. Our proxy of socio-economic background, SES, is a categorical variable indicating whether students are from a high, middle, or low SES. Our principal interest is to establish whether there is any impact of unemployment rates ($U_{f,t-1}$) on graduate destinations and whether this effect is heterogeneous across the socio-economic backgrounds of graduates. To capture this heterogeneity, we include an interaction term between graduate SES and the log of the unemployment rate at year of graduation.[4] Hence, δ is our parameter of interest in equation (2.1):

$$\begin{aligned} Y_{ifhdt} = \alpha + \beta ln(U_{f,t-1}) + \gamma SES_{ifhdt} + \delta ln(U_{f,t-1}) * SES_{ifhdt} \\ + \lambda ln(U_{d,t-3}) + \sigma ln(U_{d,t-3}) * SES_{ifhdt} + \theta X_{ifhdt} + \omega_{ifhdt}, \end{aligned} \tag{1}$$

The outcome variable, Y, represents the activity status of a graduate student 6 months after graduation, or the characteristics of his or her job when employed. The main variation we exploit comes from changes in unemployment over time. How we define the unemployment rate is an important issue because this must represent the labour demand conditions that individuals face at the time of their transition from Higher Education to the labour market. First, we use the unemployment rate at the time of graduation to capture the relevant labour economic conditions. This is what is likely to best capture the job market faced by each individual at time of graduation (Cockx and Ghirelli, 2016; Kahn, 2010; Liu et al., 2016; Oreopoulos et al., 2012). Second, instead of looking at the total unemployment rate we focus on the unemployment rate of the sector related to the degree studied by students. As to our knowledge, only Altonji et al. (2016) has used unemployment rate by field of study in their analysis. Thus, we proxy labour demand conditions using *field* or subject-specific graduate unemployment rates as we assume that what really matters for graduate

[4]The use of the log allows us to take into account that different SES groups experience different average rates of the outcome of interest.

labour market outcomes is the labour demand within their sector. Graduates in fields highly sensitive to the business cycle - such as business studies - might experience a higher penalty in making the transition to the labour market during a recession than graduates in fields where long-term demographic trends matter more - such as medicine or education.[5] Notice that the unemployment rate by field of study is demeaned so that we can interpret the non-interacted estimated coefficients of the SES indicator ($\hat{\gamma}$) as if there was no interaction with the unemployment rate.

In Section 2 we explained that the educational system is rather rigid and that it is unlikely that students can respond by adjusting their choices to the business cycle. This makes our estimates more likely to have a causal interpretation. However, one possible concern with this empirical strategy is that business cycle variables affect the decision to enrol in HE, and therefore the composition of the cohort. We condition on several socio-demographic and academic characteristics of graduates, X: gender, cohort (defined by student's year and month of birth), ethnicity, disability status, and degree classification. We also consider distance in Km between the domicile at the time of the university application and the university attended, as a proxy for the propensity to be geographically mobile.

Furthermore, we condition on the unemployment rate at time of enrolment. This is because the business cycle might have played a role in the decision to enrol in HE and on the choice of the degree.[6] Ignoring this aspect would bias our results since the unemployment rate is a serially correlated variable. To best capture labour market conditions at time of enrolment we use the unemployment rate at the Local Authority District (LAD) level.[7] We consider that this is the

[5] All our regressions cluster the standard errors by field-specific time trend to take into account possible correlation of individual outcomes within subjects over time. We hence have 120 clusters (12 fields of study over 10 cohorts).

[6] The latter, however, appears to be a less important issue for the UK context, where specialization into different subjects starts during secondary school and is almost complete by age 16. Clark (2011) looks at the labour market effects on enrolment in post-compulsory education in England by using variation in youth unemployment rates across regions and over time (1976-2005). His analysis is performed at the aggregate (regional) level. He finds that youth unemployment rates have an important and positive effect on enrolment as well as some measure of expectations of future labour market success at national level. In another recent study, Barr and Turner (2015), find a positive impact of the Great Recession on post-secondary enrolment outcomes in US by using variation in local labour market conditions as well as state-specific variation in Unemployment Insurance (UI) programs and their duration. Taylor (2013), investigates the effect of leaving education at age 16 when unemployment is high for both men and women in Britain. He finds the negative effect of an increase in unemployment rates for men. Other papers in the UK suggest that aspiration and attitudes towards education are influenced by the economic climate, and this varies across different groups in the population, with particularly important differences across SES (Meschi et al. 2011, Tumino and Taylor 2015, Rampino and Taylor 2012).

[7] Local authority districts is a generic term to describe the district level of local government in the United Kingdom. It includes non-metropolitan districts, metropolitan districts, unitary authorities and London boroughs in England; Welsh unitary authorities; Scottish council areas; and Northern Irish district

relevant proxy of the labour market circumstances affecting students before university enrolment. The LAD unemployment rate is measured at time of enrolment, i.e. $t-3$,[8] and is attributed to each student using the area where the student was domiciled before going to university (U_d). We also consider the interaction of U_d with the SES categories, to allow for different effects for different subgroups of the population.

The composite error term of equation (2.1) includes linear time trend (t), SES time trend ($\zeta_i * t$), field of study dummies (μ_f), HEI dummies (ρ_h), and LAD dummies (τ_d) as shown in equation (2.2a). In this manner we compare students within university and field of study and take into account overall macroeconomic shocks and changes in SES student composition over time. However, this specification does not take into account that different fields of study might have experienced different trends with respect to the outcome considered because they associate with different sectors in the economy. This heterogeneity could confound with the unemployment rate by field of study. We hence implement a specification where we also include a field-specific time trend, $\mu_f * t$, as in equation (2.2b). Finally, in a third specification we condition on year dummies, ν_t, instead of a linear time trend (2.2c). In this way we take into account any cohort-specific shocks that could otherwise confound the effect of the yearly changes in the unemployment rate.

$$\omega^a_{ifhdt} = t + \zeta_i * t + \mu_f + \rho_h + \tau_d + \phi_{ifhdt}, \tag{2a}$$

$$\omega^b_{ifhdt} = t + \zeta_i * t + \mu_f * t + \rho_h + \tau_d + \phi_{ifhdt}, \tag{2b}$$

$$\omega^c_{ifhdt} = \nu_t + \zeta_i * t + \mu_f * t + \rho_h + \tau_d + \phi_{ifhdt}. \tag{2c}$$

council areas. The areas are made up of whole electoral wards/divisions. `http://data.gov.uk/dataset/local-authority-districts-uk-2012-names-and-codes`

[8] From the data we know when students enrolled. The majority of our sample enrolled 3 years before graduation. Time from enrolment to graduation is very stable over time and does not vary with unemployment. To address this concern we will only select full-time students.

4 Data and descriptive statistics

4.1 Data

The Destination of Leavers from Higher Education (DLHE) is a very rich survey that is carried out 6 months after graduation on the whole population of graduates from UK Higher Education Institutions. The survey is conducted by the Higher Education Statistical Agency (HESA). This survey replaced the First Destination Survey in Autumn 2003, and it contains a larger amount of information on graduate labor market outcomes, including main activity status, occupation, salary and type of contract, among others. The dataset is linked to the Universities and Colleges Admissions Service (UCAS) student applications, which contains student demographic characteristics (e.g. their nationality, their ethnicity, and their parents' social class grouping derived from their occupational status), and information about their education before attending university (type of school attended, overall grades obtained in A level examinations at KS5). There is also information on degree class, subjects studied, and the HEI attended. The DLHE started in the academic year 2002/3 and in this paper we use information up to year of graduation 2011/2.

The DLHE allows us to investigate the activity status of students and the type of job that they are doing 6 months after graduation. We present all our results separately for (i) activity status, and (ii) type of job held. This is to highlight the fact that in the second group of outcomes we consider only students in full-time or part-time employment at the time of the survey. In our empirical specification we do not however model this selection. All outcomes are dummy variables (=0/1) except for the salary. More specifically the definition of our main outcomes is as follows:

- *Activity status*:

    1. Whether studying in a HE programme (higher degree by research, higher degree by taught course) vs. all other activity statuses;
    2. Whether studying in a professional programme (postgraduate diploma or certificate, first degree, other diploma or certificate, professional qualification, other qualification) vs. all other activity statuses;

3. Whether working full-time vs. all other activity statuses;
4. Whether working part-time vs. all other activity statuses;
5. Whether unemployed vs. all other activity statuses;
6. Whether doing something else (e.g. voluntary jobs, non-paid internships, other not specified) vs. all mentioned activity statuses.

- *Type of job for those working either part-time or full-time*:

7. Part-time vs. full-time jobs;
8. Managerial/professional occupation vs. all other socio-occupational categories (built on the Social Occupation Classification);
9. Graduate vs. non-graduate job (students are asked whether their degree was required for the job);
10. Fixed-term contract for less than 12 months vs. all other types of contract;
11. Natural log of self-reported annual gross salary (for full-time employed only).

4.2 Sample selection

Since our main interest is the transition from Higher Education to work, we start by selecting a sample of full-time non-mature first degree students (2,082,080), which comes to about 45% of the initial sample of graduates. We restrict our analysis to UK nationals ($> 90\%$). This is because our main interest is to see how graduates of different SES groups are affected by the business cycle, and it would not make sense to compare SES across different countries.[9] As one of the variables defining SES is based on the neighbourhood where students lived before going to university, we include only mainland areas in the UK (dropping 5,164 observations). We further restrict our analysis to English universities because comparisons with the other UK countries would be difficult due to institutional differences (in tuition fees, in maintenance grants regime, and duration of study). Our intermediate sample consists of 1,492,289 observations.

[9]Information on SES is missing for a large proportion of non-UK nationals.

Next, we operate the following restrictions. First of all, we look at information on the subject studied. Some students appear in the records as studying a combination of subjects. As the percentage of time spent on each subject is recorded in the data, we assign a field by taking the course attended for more than 50% of the time. In some cases, however, the field is undefined (8,665) or there is no field which is studied for at least 50% of the time (6,440). Another small number of observations (15,651) is dropped because the field of study does not find an equivalent in the Labour Force Survey, which is our source of information on field-specific unemployment rates.

Secondly, we drop observations for which we cannot derive an indicator for SES. This means we exclude records with missing information on: domicile before attending university (6,859); type of school attended (private vs. state) or participation in Higher Education at the area level (152,709). Finally, we drop all students included in the issued sample but who did not reply to the survey (247,095). The latter is probably the most controversial selection, so we will check that response rates do not vary by SES and unemployment (see Section 7). Our final sample consists of 1,054,863 records, about 71% of our intermediate sample. Table A1 in the Appendix summarizes the restrictions that we implement in the sample selection.

4.3 The SES index

The three main pieces of information that we use to derive an indicator of family SES[10] are derived from UCAS applications. The first variable we consider is the Low Participation Neighbourhood marker (LPN), which summarizes the Higher Education participation in the neighbourhood of residence at the time of application to university. This is expressed in quintiles.[11]

The second variable indicates the type of secondary school attended, codified as state vs. private. This is clearly an indicator of SES, since those from wealthier families are more likely to go to private schools (Artess et al. 2014). Finally, we know the postcode sector of the residence of students before

[10]There is more information on SES in the data but we cannot use it because this is available only from year of graduation 2005/6 and has a large amount of missing values. This consists of variables such as (i) the socio-economic classification of the parent who earns the most, defined by the 8 social class categories, and (ii) an indicator on whether parents have a degree.

[11]More precisely, this variable is based on the HE participation rates of people who were aged 18 between 2005 and 2009 and entered a HE course in a UK Higher Education institution or an English or Scottish further education college, aged 18 or 19, between academic years 2005-06 and 2010-11.

university. We match to this the corresponding value of the Index of Multiple Deprivation (IMD).[12] Figure 1 (a, b, and c), shows the distribution of these proxies of SES across the period we observe. We can clearly see that the distribution has been quite stable over time, with no sharp change in the composition of graduates by SES. If anything, we can see a small monotonic increase in graduates coming from a low SES background.

We next construct an overall SES index. The three different characteristics (LPN, type of school, and IMD) capture family SES in a different way, so that, by pooling these variables together, we hope to better capture the socio-economic background of the students. To create the SES index, we use principal component analysis (PCA).[13] We consider the last cohort of graduates (the one with the smallest amount of missing information on SES variables) and we take the values (or weight) attributed by the first principal component to each category within each SES variable. For all our cohorts, we then create a score that is equal to the sum of the actual value of the variable multiplied by the values obtained using the PCA. In this way we build a composite SES continuous variable which defines individuals' socio-economic background in a consistent way across time. This allows us to take into account any changes in the SES composition of students across the ten years considered. We then split this score into quintiles. Figure 1.d shows that the percentage of students in the highest three quintiles slightly falls over time. The share of the lowest quintile (Q5), those students with the lowest SES, rises over time, suggesting that there has been a widening of the participation of low SES students in Higher Education (as previous studies suggest: see discussion in Chowdry et al. 2013). For the sake of exposition, we group the three middle quintiles in a unique category (middle SES; 55% of observations), and we retain the highest (25% of observations) and the lowest quintiles (20% of observations) to represent high and low SES, respectively. Our analysis focuses on this three-category SES index.

[12]The Index of Multiple Deprivation is derived by combining several domains of deprivation (e.g. income, employment, crime and education) of a delimited geographical area (for example in England and Wales the IMD is based on local super output areas, LSOA, which are areas with at least 1000 inhabitants and the mean population is composed of 1500 inhabitants). We use the 2010 IMD for students residing in England and Northern Ireland, the 2009 one for students residing in Scotland, and the 2011 one for students residing in Wales. The way in which the IMD is constructed differs slightly by country. To limit this concern, we transform the continuous variable in quintiles. When the same postcode is associated with different values of the IMD, because for example it is part of several LSOAs, we compute a weighted average of the corresponding IMD values depending on the extension of the postcode in the areas in which the IMD is calculated.

[13]Given the discrete nature of the variable used, we implement PCA by using the polychoric correlations.

This SES index takes into account changes in the SES composition of undergraduate students over time. Notice that in the period that we consider, there have been changes in the way that Higher Education has been financed.[14] However, Figure 1 shows that the composition of graduates by SES changed smoothly over time, reflecting long-term trends rather than any particular change of policy.

4.4 How do students with different SES differ?

Table 1 shows the characteristics of graduates broken down by SES category. We can see interesting differences between graduates of different SES groups. The highest proportion of non-white studenst is found in the low SES category; 90% of high SES graduates are white, but this percentage falls to 84% and to 70% for middle and low SES students, respectively. There are also differences in the non-white composition of the population; Indians and Pakistani represent 6% of low SES students, but only 2% and 1% of the middle and high SES groups, respectively. This suggests the importance of controlling for ethnicity to avoid confounding SES and ethnicity.

In terms of educational achievement, there is evidence that those in the highest SES perform better. While 71% of high SES students exit university with a first or higher second class degree, this percentage falls to 67% and 59% for middle and low SES groups, respectively.[15] If students from different SESs differ also in their preferences and information about the financial returns of education, then we may expect them to differ also in the choices of degree subject. There is no SES difference in the proportion of graduates studying STEM subjects compared to non-STEM

[14] From the academic year 2002/3 to 2005/6 students had to pay up-front tuition fees of a total of approximately £1,000 p/y. In 2006/7 the tuition fees increased to £3,000 p/y repayable after graduation for all students. At the same time, maintenance grants were also increased. If these changes in the HE financial system had an effect on the socio-economic composition of those going to university this would be a cause for concern. Our data consists in the population of graduate students, and it is possible that the changes that occurred after 2006/7 affected participation and drop-out rates. Dearden et al. (2011) found that tuition fees have had, on average, a significant negative effect on participation (a £1,000 increase in fees resulting in a decrease in participation of 3.9 percentage points), while maintenance grants have had a positive effect (a £1,000 increase in grants resulting in a 2.6 percentage point increase in participation), with a very small change in overall participation. In a related study, Crawford (2012) shows that the increase in tuition fees and student support (and other relevant policies implemented over the same period) may have in fact reduced the socio-economic gap in HE participation rates, but this effect is almost negligible.

[15] These differences in the academic performances are also evident if we consider the tariff score of students (information collected at the point in which students apply to enrol at HEIs and that summarizes how well the individual has done at secondary school). However, this information is not available for all cohorts of graduates in our sample, but in the robustness checks we will implement some specifications in which we condition on this information by restricting the sample of graduates to those for whom this information is provided.

(39% of graduates in each SES group graduated in a STEM subject)[16] but, within these categories, some differences arise; most notably, high SES students are more likely to graduate in Architecture & Engineering among STEM subjects and in Humanities and Languages in non-STEM subjects than middle or low SES graduates; high SES students are less likely to graduate in Mathematics & Computing (STEM) and Communication (non-STEM) degrees.

But one of the most striking differences is the type of university attended. While in the empirical analysis we consider each university singularly, here we group them by their "prestige" following standard classifications.[17] As we can see, 29% of high SES graduates attended a Russell group university and 9% of them attended a Golden Triangle university, the most prestigious groups. These percentages are much lower for low SES graduates: 14% and 4% (20% and 7% for middle SES), respectively. Conversely, the gap remains but changes direction when we look at the least prestigious groups of universities. Finally, we see that there is a clear SES gradient in the propensity of students to move geographically when going to university. The highest average distance between the domicile prior going to university and the location of the HEI attended is found for high SES graduates (129 km), followed by middle SES (111 km) and low SES (77 km).

Figures 2 and 3 show the distribution of labour market outcomes across the ten years of graduation that we consider (2003-12). The vertical line at 2008 shows the beginning of the recession in the UK. From these figures we can establish three different things. First, for all outcomes there is a visible SES gradient. High SES graduates perform better (in terms of studying for a post-graduate HE programme, Figure 2.a, or holding a full-time job, Figure 2.c), followed by middle, and then by low SES graduates. Second, when the recession hits we can see that there is a change in the trend, and this is true for all SES groups. Third, for most outcomes the differences between SES groups widens in the period post-2008. For example, the percentage of low SES graduates who report being unemployed (Figure 2.e) in the period pre-2008 is on average 7%, while this is 5.7% for high SES graduates. In 2008 there is a parallel jump in unemployment for all three groups, but at the height of the recession in 2011 the percentage of low SES graduates in unemployment is above 11%

[16] STEM subjects are: Medicine & related subjects, Biological science, Physical science, Maths & Computing, and Architecture & Engineering. Non-STEM subjects are: Social studies, Business studies, Communication, Languages, Arts, Humanities, Education.

[17] For a description of the various groups see Appendix A1.

while for those in the high SES group this is about 7.8%. What was a high-low SES gap of about 1 percentage point before the recession more than doubled a few years later. Another example is given by the part-time versus full-time job gap that we can see in Figure 3.a. While in 2003 the high-low SES gap was about 5 percentage points, in 2012 this is doubled.

4.5 Measuring labour demand

In order to capture variation in the business cycle we use field or subject-specific unemployment rates of graduate workers. These are derived from the Annual Population Survey/Labor Force Survey (APS/LFS), which is the only large dataset that contains information on activity, level of education, and field of study.[18]

Figure 4 describes the variation in unemployment rates by demographic groups (active population, graduates, and non-graduates within the same age group of graduates) over the period 2000-12. Graduate unemployment rates, as expected, are low compared to the unemployment rate of non-graduates. This is true across the whole period, the Great Recession included, where the graduate unemployment rate rose from 2.5% in 2003 to 3.1% in 2009 and to 3.2% in 2012. However, these averages disguise important variations across fields. Figure 5 shows that the variation in graduate unemployment rate over the years of graduation considered in the paper. Interestingly, there is important heterogeneity across all fields of study even within the STEM (Medicine & related subjects, Biological Sciences, Physical Sciences, Mathematics and Computing, and Architecture & Engineering) and non-STEM (Social Studies, Business & Financial studies, Communication, Languages, Arts, Humanities, and Education) categorization. For example, within STEM subjects, Medicine & related subjects exhibit a low and relatively constant level of unemployment of around 1%-2%. Instead, for graduates in Architecture & Engineering unemployment goes from 2% in the pre-recession years up to 4% in 2012, most likely a consequence of the drop in activity in the construction sector. The same can also be seen in the non-STEM group where the unemployment rate

[18]The yearly unemployment rate is calculated as an average of the quarterly unemployment rate within a year. This means that we consider the unemployment rate by field of study six months prior graduation and six months after graduation. The latter corresponds to the month in which the student in surveyed. So if a student graduated in June 2005, we consider the unemployment rate from January 2005 to December 2005.

of graduates in Education (another sector not particularly affected by the business cycle) has been stable at around 2% across all years considered, while graduates in Business studies experienced an increase of two percentage points with the recession. We expect to see these differences across fields of study. They are determined by the fact that the recession affected different sectors in different ways, and this is what we want to exploit in our analysis. On average in the UK between 2008 and 2012 there has been a decrease in the workforce in industries such as wholesale & retail trade, manufacturing, construction, administrative & support service activities, and arts, entertainment & recreation. On the other hand, sectors like human health & social work activities saw a rise in workforce jobs (ONS, 2011).

To capture the local labour market conditions at time of enrolment we use unemployment rates at LAD level derived from the Claimant Count statistics.[19] We associate a level of unemployment to each graduate depending on the postcode where s/he was living before going to university. Figure 6 shows that the average unemployment rate at enrolment measured at LAD level followed a U-shape, with relatively high levels for the first and the last cohorts when compared to the middle cohorts. On average this measure of unemployment ranges from a minimum of 2% to a maximum of 3%, although much more variation is found across different LADs, with values between 0.5% to almost 8%.

5 Results

5.1 The consequences of graduating in bad times

Graduating during a recession could have different consequences on initial labour market outcomes. First, the literature on human capital investment suggests that the trade off between continuing to study and entering the labour market depends on whether the labour market is tight (Clark, 2011; Taylor, 2013). In our case, we would expect that graduates who finished their undergraduate studies in the recession to be more willing to continue their studies given the relative low returns of entering the labour market at that time. We would also expect that those induced to

[19]This data is made available by the Office for National Statistics at `https://www.nomisweb.co.uk/`.

stay in education by the bad economic climate would choose less academic and more professional oriented programmes. This is because the recession brings less "academic" individuals to stay in education. These individuals delay their entry in the labour market by acquiring further education that will be useful in the labour market. However, staying in education is financially costly because of the living and fees expenses, and the lack of income. So we would expect that, while students from an advantaged background have the resources for staying in education, this is less the case for low SES students.

Furthermore, during recessions, firms adjust in the following ways: by decreasing the number of vacancies, by decreasing the numbers of hours offered, or by decreasing the salaries offered. We hence expect to see an increase of activity statuses such as unemployment and part-time jobs versus all other possible states. If students from disadvantaged SES are not able to stay in education or to get into alternative activities, such as unpaid internships, they will be more affected by the worse economic climate than high SES students. If this is true, we should also see that among the pool of employed students only, those from disadvantaged backgrounds are less likely to work in high quality jobs.

Table 2 shows the results of our analysis for the activity status of students 6 months after graduation. We have six definitions of activity, and three different specifications for each of them. All specifications control for the demographic characteristics of the students, such as gender, ethnicity, and disability status. We also take into account academic outcomes by using degree class dummies, field of study dummies, and HEI dummies, and for the economic condition at time of enrolment by using the unemployment rate at LAD level and its interaction with SES. We further condition on a linear time trend. In addition to these, in specification 2 we include field-specific trends, and in specification 3 we consider dummies for year of graduation instead of a linear time trend to take into account possible changes in survey coverage that have affected all groups equally and to consider general time shocks. As we can see, the results are not very sensitive to these different specifications. Therefore, we focus on specification 2 because it allows us to fully exploit the yearly variation of the unemployment rate by conditioning on a linear time trend instead of year of graduation dummies.

It is clear that there are statistically significant interactions between SES and unemployment rates. An increase in the unemployment rate at the time of graduation by field of study results in low SES students being less likely to be enrolled in HE programmes and more likely to be unemployed. Both low and middle SES students are more likely to be enrolled in professional programmes and to be in part-time jobs. They are less likely to be in full-time jobs and in alternative activity statuses (outcome "Other"). The non-interacted coefficient on the middle and low SES coefficients shows *ceteris paribus* the differential in the outcome between high, middle and low SES students.[20]

From these results we can conclude that when the unemployment rate is high students are more likely to stay in education. However, while high SES students are more likely to enrol in HE programmes, disadvantaged students are more likely to enrol in professional programmes. Disadvantaged SES students are also less likely to be in full-time jobs but are more likely to be in part-time jobs or to be unemployed. On the other hand, advantaged students are more likely to be in gap years, and employed in non-paid internships and voluntary jobs. We thus find evidence that both advantaged and disadvantaged students postpone their labour market entry when the unemployment rate is high. However, it seems that disadvantaged students are more likely to invest in courses which promise quicker and safer returns in the labour market compared to those courses that are more academic. We find that disadvantaged students choose to switch to new subjects (e.g. diplomas) that plausibly promise relatively high returns in the labour market, or to specialize in a profession that is not very sensitive to the business cycle (e.g. teaching).[21] Another way of escaping the bad economic conditions and increase one's own human capital is to participate in internships and other activities that will help to build a portfolio that is valuable in the labour market. These activities, however, are often not remunerated, so only those with financial support have access to them. We hence interpret our results in terms of high SES students falling back more

[20]Notice that these coefficients are affected by the other interactions between the SES variables and other terms. For example, with respect to the HE programme outcome, low and middle SES coefficients are 0.002 and 0.004 (although they are not statistically significant). However, the SES-specific trends (not shown in Table 2) for middle and low SES graduates are indeed negative and statistically significant (-0.001, statistically significant at 10% for middle SES and at 1% for low SES graduates). As another example, the coefficient indicating middle and low SES students are negative with respect to the part-time job variable (-0.002 and -0.003 not statistically significant), although their SES-specific time trends are positive (0.001 and 0.002, respectively) and statistically significant at the 1% level.

[21]This is consistent with what has been found in Blom et al. (2015), i.e. when the labour market is tight, students enrol in those courses with higher returns.

than disadvantaged SES on these alternative ways to traditional jobs when the unemployment rate is high.

Table 3 shows the effects of unemployment on the *quality* of the job. Notice that this set of outcomes is only observed for those students who are either in a part-time or full-time job six months after graduation. Consistent with our previous results, higher unemployment rates lead to a deterioration in the quality of the jobs held by low and middle SES graduates. Specifically, a higher rate of unemployment increases the probability that a graduate from a more disadvantaged family background will hold a part-time vs. a full-time job, and it reduces the probability that s/he occupies a professional position and that s/he finds a job for which a degree is actually required. Salary is also negatively affected; a one percent increase in the unemployment rate decreases the yearly salary of full-time employed graduates by 0.01 and 0.02 percent on an average salary of £20,600. We do not find any statistically significant effects of unemployment rate on type of contract, however.

Table 4 shows how much of the SES gap can be explained by the increase in the unemployment rate for the cohorts who graduate before the recession (2003-07) compared to those who graduated just after (2008-12). In this manner we can quantify how much of the spread in the SES gap in labour market outcomes is explained by the increase in unemployment rates during the Great Recession. First, we compute the differential of the gap between high and low SES before/after the recession (columns 1-3). Second, in column 5 we multiply the estimated coefficient of the interaction between the unemployment rate and the low SES dummy (column 4) with the percent change of unemployment.[22] We finally divide this product by the differential of the SES gap across the two periods to obtain the contribution of the recession to the increase in this gap (column 6). Our model can explain about 20% of the actual increase in the gap between low and high SES graduates in terms of enrolment in HE programmes. The implication is that the remaining difference is explained by general trends as well as changes in the composition of graduate students. The total increase in the unemployment SES gap is explained by the observed changes in demand. Among employed graduates, the rise in the unemployment rate can explain 36% and 63% of the SES gap widening in

[22]The average unemployment rate between the two periods increased from 2.9 to 3.9 percent (about 35%).

part-time versus full-time jobs and in professional occupations, respectively. We can hence conclude that the recession has had a heterogeneous and relevant impact in widening the SES gap across the different outcomes considered.

5.2 Heterogeneity: gender, STEM field, and quality of university

We are interested next in establishing whether graduating in bad times affects the SES gap of certain groups more than others. There are three types of characteristics that we focus on. The first one is gender. Within the same sector, e.g. the health sector, there could be gender differences in terms of the specific role in which graduates are employed. Some of these might be affected more than others by the recession (because they require differences in hours worked or salary). Furthermore, with the expansion of HE, the quality of the university attended might be considered an important signal of quality by employers. This signal may be of particular relevance when the labour demand is low. Finally, we will specifically look at STEM vs. non-STEM degrees. It has been found that having a STEM degree in past recessions has mediated the negative effects of graduating in bad times. This has been less the case in the latest recession, given the financial nature of the downturn (Altonji et al., 2016). Within these categories, the SES status of students can interact differently with the recession. For example, students from a low SES status might not be particularly affected if they graduate from a top university or in a degree that was not particularly affected by the recession.

We interact the main coefficients of interest (SES, unemployment rate by field, and their interaction) with the following characteristics of the students: gender, whether s/he graduated from a top ranked university (i.e. Golden Triangle group), and whether the student graduated in a STEM field. Table 5 shows the results for activity status outcomes and Table 6 shows the results for the quality of job outcomes.

Interestingly, we do not find relevant differences in the SES gradient across gender or across type of university attended. The most relevant results concern the type of degree obtained. Disadvantaged graduates in STEM degrees are less likely to be studying in postgraduate programmes, and are less likely to be in full-time jobs than high SES students. Furthermore, the former are more

likely to be in a part-time job and are less likely to be working in non-paid jobs. When employed, the quality of jobs of disadvantaged students in STEM subjects is statistically significantly lower compared to advantaged students. Finally, disadvantaged graduates in STEM degrees are more likely to work for a period of twelve months or less.

These results suggest that the recession has increased the SES gradient for students who graduated in STEM subjects compared to non-STEM subjects. This can be explained by the fact that the recession has affected STEM sectors more than others. These findings are consistent with those found by Altonji et al. (2016) in the U.S.

6 Possible mechanisms

SES gaps in the labour market might arise because of differences in human capital, financial resources, or access to social and professional networks.[23] We rule out explanations in terms of human capital since we consider a population of first-degree full-time graduates, we look at their situation 6 months after graduation, and we condition on university attended and degree class. This leaves us to consider social and financial capital as possible reasons for the existence of an SES gradient.

The previous results show that, during a period of higher unemployment, the graduate SES gap in labour market outcomes - measured in terms of activity or quality of jobs - widens significantly. A higher level of unemployment would have negative effects on both the effectiveness of social networks - as individuals in these networks are likely to become unemployed themselves - and the amount of financial resources individuals can rely upon. In both cases these effects should be more severe for more disadvantaged families. This is because: (i) their social networks are more likely to be made up of lower-skilled individuals whose jobs are more vulnerable in a recession, and (ii) their families have lower levels of wealth or savings that can be used to counteract reductions in income due to unemployment or lower earnings. Due to this, our results cannot reveal yet whether social or financial resources drive SES inequalities in the labour market.

[23] There is of course the possibility of discrimination, but we do not consider it here.

To go one step further, we analyse more closely the process which leads some graduate students to find a job after leaving university. First, we look at whether the student indicates that s/he has found a job through family or social networks as opposed to employer adverts, web searches, etc. We call this the degree of effectiveness of social networks. Second, we consider the degree of geographical mobility associated with finding a job, the idea being that a higher degree of geographical mobility is related to a higher availability of financial resources. Notice that in all of our regressions we control for the distance (in Km) between the domicile before enrolment into university and the location of the HEI attended, as a proxy for the propensity of being geographically mobile (on the basis of preferences, for example).

We start by examining the impact of the recession on the effectiveness of social networks.[24] Figure 7.a shows that there is a remarkable fall in the effectiveness of social networks during the recession period for all SES groups. This job search method then becomes particularly successful again in the period after the recession where, however, the SES gap grows. As seen in column 1 of Table 7, the regression results clearly show that higher levels of unemployment make it less likely that low and middle SES students will find a job through family and social contacts.

The geographical mobility outcome may help to understand how financial resources of graduates and their families determine their labour market outcomes. Being able to find or take a job requires, at least initially, extra expenditure in travel and accommodation. Consider, for example, the travel and accommodation on the day of an interview. If capital markets are imperfect and students are financially constrained, the only way to meet these costs is by drawing on family resources. If the recession had a stronger impact on the resources of low SES families (as compared to the high SES families), the area of job search for low SES students would be smaller than for high SES students. We should therefore expect that during the recession disadvantaged graduates are more likely to find a job closer to their original domicile compared to advantaged students.

On the other hand, the economic opportunities in the domicile area could deteriorate more rapidly for low SES than high SES students during periods of rising unemployment. We could hence expect that during the recession disadvantaged graduates are less likely to find a job closer

[24] Figure A1 shows the trends across the period considered for each of the successful channels to find a job.

to their original domicile compared to advantaged students. However, our regressions include LAD fixed effects and LAD-specific unemployment rates at the time of high school. As a result, this channel should be controlled for. So, if (a lack of) financial resources were an important mechanism driving the first destinations of graduates we would expect that during a recession graduate students from low SES families would find jobs closer to their domicile.

Figure 7 shows that low SES students are on average more likely to find a job closer to home than middle or high SES students. This is compatible with the idea that coming from a more disadvantaged family restricts the area of geographical job mobility. The figure also shows that the degree of mobility of low SES students decreases over the observed period, but there is not a visible discontinuity before/after the start of the recession. There is instead a longer-term trend which could be attributed to many different factors. Once we take the data to our regression model (column 2 of Table 7) we see that in fact the effects of unemployment are quite surprising. Controlling for SES-specific trends, as well as for initial propensity to move (distance from domicile to HE), higher unemployment rates push low SES students to find a job further away from their domicile. This result would suggest that the deterioration of family financial resources during a recession is not the main mechanism explaining the destination of young graduates.

In order to investigate this effect further, we consider an alternative channel. We see that in our data graduates who found their job through social networks work closer to their original domicile than when the job has been found through other channels.[25] We could hence expect that during the recession disadvantaged graduates were less likely to find a job closer to their original domicile compared to advantaged students because their social networks were less effective.

In columns 3 and 4 of Table 7 we look at the geographical mobility separately by whether the job was found through networks or through any other channel. We find that the group who drives the previous result is the group of graduates who found a job through other channels. In other words, during the recession among students who had no effective social networks, those disadvantaged found a job farther away from their original domicile than advantaged students. These findings strengthen the importance of the social network as a safety net when the labour market is tight.

[25]The average distance between domicile and workplace is 65 (54) Km when the job has been found through social networks (other channels).

7 Robustness checks

In this section we address three specific concerns. First, it is possible that we do not control well enough for academic achievement given that degree class is a very broad indicator (half of our students gain an upper second class degree). Second, we have a large number of missing values for our salary variable. Indeed this is only available for students in full-time jobs. Third, response rates to the survey might be a function of SES and unemployment rates.

Early academic achievements are particularly important in determining later academic outcomes.[26] We therefore include in our specification the tariff score. The tariff score summarizes the grades achieved in post-secondary academic exam results ("A levels") - which are usually a prerequisite for university enrolment in the UK, and other vocational qualifications obtained post-16. Tariff scores are available only from graduation year 2004/5 however, and there are year-on-year differences in the range. As a result, we use quintiles.

Tables 8 and 9 show that the inclusion of the tariff score does not importantly affect the magnitude and the statistical significance of the coefficients of interest. This might be because of the important positive correlation between the tariff scores and the degree classification. As a result, having the latter already in our model is sufficient to take into account differences in human capital. However, when there are differences compared to the baseline specification, the coefficients are greater (e.g. full-time job, professional qualification, and professional job) and are of statistical significance (e.g. graduate job, fix contract), making our previous findings even stronger.

The salary is reported with a large number of missing values (only 308,765 replied to this question out of the 575,869 graduates in a full-time job).[27] Given this issue and the fact that the salary is self-reported we imputed the salary using the Annual Population Survey (APS). We did this by matching the DLHE with the APS on six dimensions: region, full-/part-time, number of employees in workplace, permanent vs. fixed and temporary contracts, industry sector, occupation

[26] Several papers have highlighted how in the UK SES is particularly important in determining university entry, drop-out and academic attainment (Chowdry et al. 2013, Johnes and McNabb 2004, McNabb et al. 2002, Smith and Naylor 2001, Vignoles and Powdthavee 2009). Chowdry et al. (2013) recognize that, while participation rates at high status universities by SES has decreased over time (they observe the period 2004-2007) the gap still persists and it is mostly attributed to poor achievement in secondary school.

[27] Notice that we exclude those reporting a null salary and we trim the highest and the lowest 1 percent of the distribution to exclude extreme values. Results are not sensitive to this restriction, however.

code.[28]

Table 10 shows our estimates of interest when using this imputed salary as the dependent variable for the salary at 6 and 42 months after graduation. For the salary at six months after graduation we also report the estimates for the population of full-time employees to obtain a better comparison with the results that we obtained with the self-reported salary (which was only asked to full-time employees). The sign and the magnitude of the coefficient of interest for full-time workers in columns 1 and 3 is very close to what we obtain when using self-reported salaries in Table 3. Furthermore, the estimates in column 2 suggests that the SES gradient increases over time.

One of the concerns related to the use of the DLHE is that there is a relatively high non-response rate (about 16.72% non-respondents and 2.27% explicit refusals). If this differs by SES according to levels of unemployment, it could introduce a source of bias. We run a linear regression on whether graduates replied to the survey to see whether in periods of high unemployment the probability of response varies by SES. Table 11 shows the results. In periods of a high unemployment rate, we do not find any evidence of different behaviour across the SES groups on the likelihood of responding to the questionnaire. The coefficients of the interaction term of SES and unemployment are not statistically significant.

8 Is graduating in bad times having long-lasting consequences?

Our main outcomes are measured at 6 months after graduation. While looking at graduate destinations is interesting, it might not be a good proxy for long-term labour market outcomes and future careers of those affected. It has however been shown (and we discussed this in section 1) that graduating during recessions has long-lasting negative consequences for the career progression of those affected. As a result, we expect to see a strong association between short- and long-term outcomes. If there is a perpetuating effect of economic conditions from short to long-term outcomes and we see that individuals from different SES respond differently to the economic conditions at graduation, this can have important implications with respect to the perpetuation of socio-economic

[28] We used only four of these dimensions when industry sector or number of employees was not available.

inequality and reinforcement of barriers to social mobility in the long term.

We now investigate how the outcomes at 6 months are related to those at 3.5 years after graduation and if this relationship changes for the cohorts who graduated in the period pre/post-recession. To do this we use the DLHE questionnaire collected at 3.5 years after graduation. Notice that this questionnaire is run only for certain cohorts of graduates and only a subsample of students within each cohort is contacted. Hence, in our data we have the opportunity to observe four cohorts of students for which we know their outcomes at both 6 months and 3.5 years after graduation. These are the cohorts who graduated in 2003, 2005, 2007, and 2009. Because only a representative group of the population of graduates is contacted for each cohort, we use the weights provided by HESA in our analysis. Also notice that the number of students contacted for the longitudinal survey has increased over time.

Table 12 shows the coefficients associated with the activity statuses at 6 months after graduation. The omitted one is full-time employment. It is clear that there is an important and statistically significant relationship between the outcomes at 6 and 42 months after graduation for both pre and post recession groups of graduates, and that this goes in the expected direction. The 2009 cohort exhibits a higher degree of correlation between the outcomes at 6 and 42 months after graduation (even after accounting for the difference in the average value of the outcome before/after the recession) for outcomes such as full-time job, part-time job, and study. Overall, the highest correlation is found among the same activity statuses. We hence conclude that there is strong evidence that the activity status at entry in the labour market is a good indicator of future career prospects.

We next look at the interaction of SES with the unemployment rate at 6 months after graduation to see whether there is any evidence of the SES gradient also at 3.5 years after graduation. More specifically, we focus on the activity status as well as on whether graduates work in a professional occupation, achieved a qualification as high as a master or higher, and on the salary earned. Results are shown in Table 13. The signs of the coefficients indicate that low SES graduates are less likely to be in a full-time job, to be studying, to be working and studying, to be employed in a professional occupation and to hold a postgraduate degree. They are instead more likely to be in a part-time

job, to be in other jobs, and to be unemployed. However, only the negative effect on wages is statistically significant.

Finally, given the importance that work has in our lives, we would expect that the recession, through the negative impact on the activity status and job quality of individuals, has affected other dimensions of life such as well-being. Furthermore, if graduating during a recession has negatively affected the possibility that individuals have the jobs that they probably expected when they invested in their Higher Education studies, this might generate sentiments of frustration and regret. If different SES groups have been differently affected (as we have already shown) we would also expect that these levels of dissatisfaction or regret differ across these groups. In other words, if low SES students have been affected by the recession more severely than others, we would expect that the low unexpected returns of the degree qualification would affect the well-being, broadly speaking, of disadvantaged graduates in particular.

The DLHE longitudinal survey asks graduates whether they are satisfied with their career and their likelihood of choosing to study a different subject, to study in a different institution, and to study a different qualification with respect to the choices made 3.5 years earlier. These variables are scaled from 1 to 4. For the satisfaction variable, category one corresponds to "not at all satisfied" , category three to "not very satisfied", two to "fairly satisfied" and three to "very satisfied". For the likelihood of making different choices the values one to four correspond to "very likely", "likely", "not very likely", and "not likely at all", respectively.

Table 14 shows that a higher unemployment rate is associated with disadvantaged graduates being more likely to state that they would change qualification (i.e. they would not obtain an undergraduate degree) and subject studied if they could go back in time by 3.5 years. Low SES graduates would, however, not change the university in which they studied. Nevertheless, only the finding on the likelihood of change of the field of study (subject) is statistically significant for low SES. Disadvantaged graduates who graduated in bad times are unsatisfied with their professional career. This is true especially for low SES graduates for which a worsening of the economic conditions at graduation is equivalent to a decrease in career satisfaction, which is statistically significant at the 5% level. We hence provide evidence that graduating in bad times differently affects individuals

from different backgrounds on several outcomes in the sphere of well-being 42 months later.

9 Conclusion

In this paper we address two important questions. We first ask whether achieving a higher level of education is enough to ensure that an economic downturn will not increase socio-economic inequalities in the labour market. We then go on to analyse whether the SES disadvantage in securing a job and in finding a good match during "bad times" is due to the deterioration of financial or social capital endowments.

We use data from the Destination of Leavers from Higher Education Survey, a repeated cross-sectional survey of graduates leaving UK universities after completing their qualification. We observe successive cohorts of graduates over the period 2002/3 to 2011/2 and match this dataset with information on graduate labour demand using field-specific unemployment rates derived from the Labour Force Survey. This allows us to use variation over time and across field of study to identify the effect of the Great Recession on entry-level graduate labour market outcomes.

Our results show that the sharp increase in unemployment experienced by the UK - as well as many other countries - between 2009 and 2011 translated into wider SES gaps across a range of labour market outcomes measured 6 months after graduation, including employment, salary and access to professional or graduate occupations. This is so after taking into account the effects of compositional changes in the population of graduates, university fixed effects, field- and SES-specific time trends, and economic conditions at the time of enrolment.

Next, we analyse the possible mechanisms that explain our findings and we provide evidence of the importance of social capital. The recession impacted negatively on the effectiveness of social networks as a channel to find employment, and this was more so for students from disadvantaged families.

Finally, we provide evidence of the persistence of the SES gradient over time. This might explain the higher level of career dissatisfaction and regret about the subject studied that we found among disadvantaged graduates at 42 months after graduation.

Overall, our findings show that the recession has reduced social mobility even among the most educated stratum of the population since the negative effects of the recession on labour market outcomes have long-lasting effects on graduates' careers.

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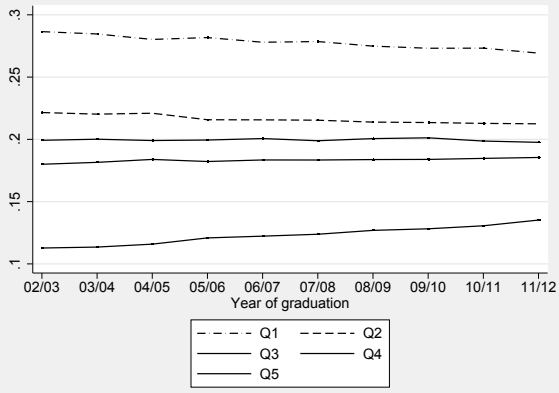
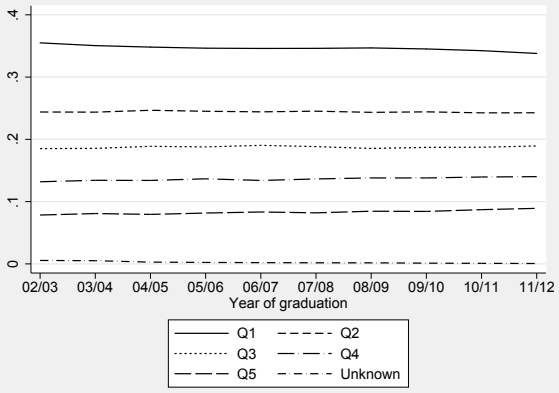
Figure 1: SES indicators

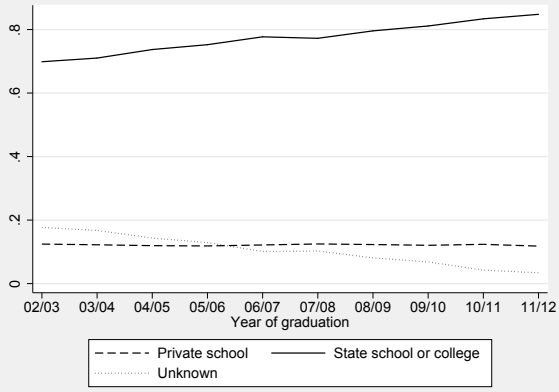
(a) Index of Multiple Deprivation (IMD)



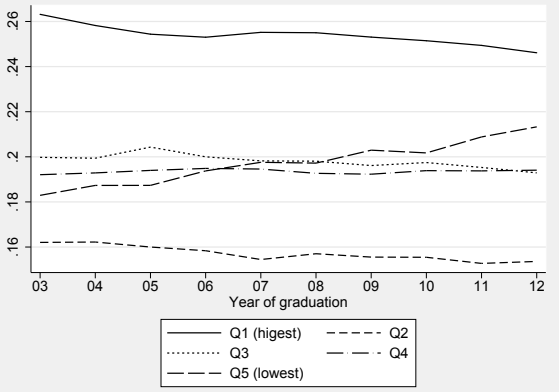
(b) Low Participation Neighbourhood (LPN)



(c) Type of school



(d) SES Index

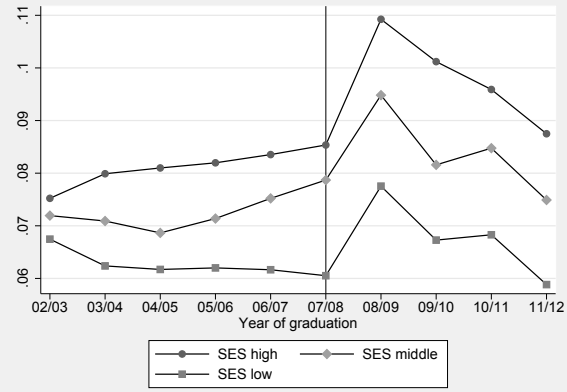


Notes.

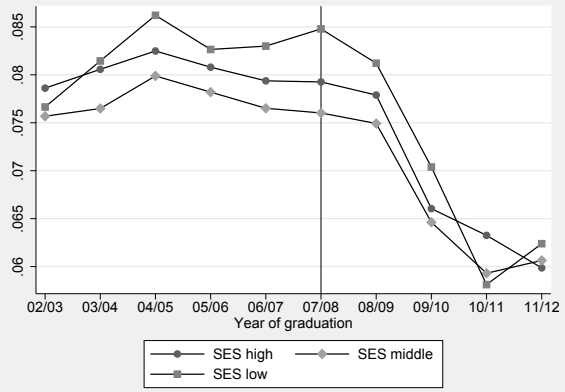
DLHE data on the selected sample described in section 4.2. The variables used to construct the SES index are described in Section 4.3.

Figure 2: Labour market outcomes - Activity status

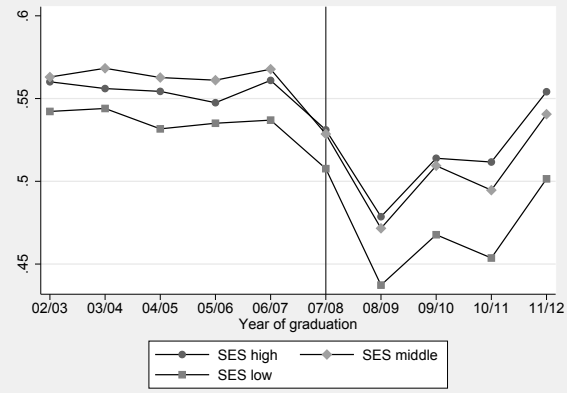
(a) Studying in HE programme



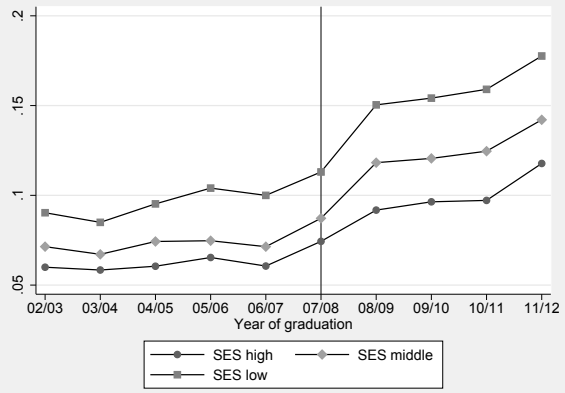
(b) Studying in professional programme



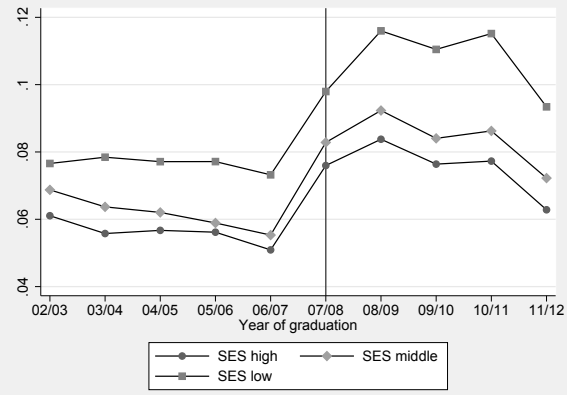
(c) Full-time work



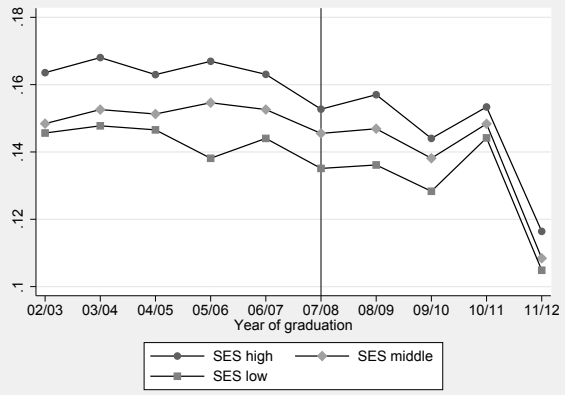
(d) Part-time work



(e) Unemployed



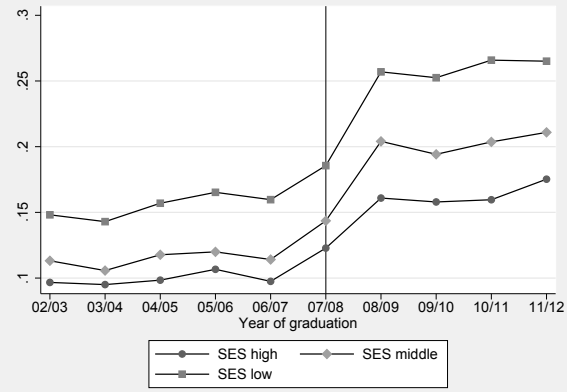
(f) Other activity status



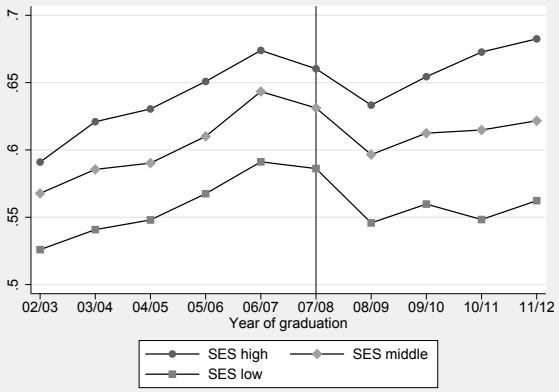
Notes. DLHE data on the selected sample described in Section 4.2. The variables are described in Section 4.4.

Figure 3: Labour market outcomes - Employed graduates only

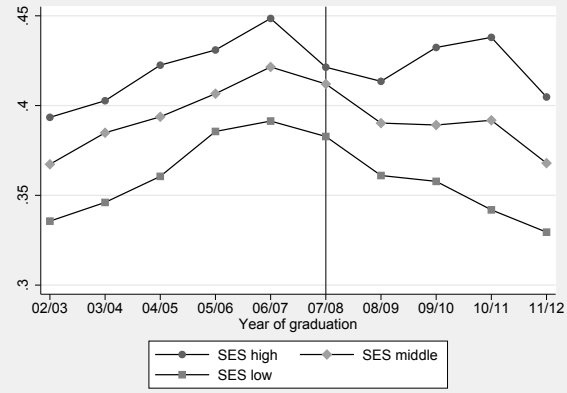
(a) Part-time vs. full-time job



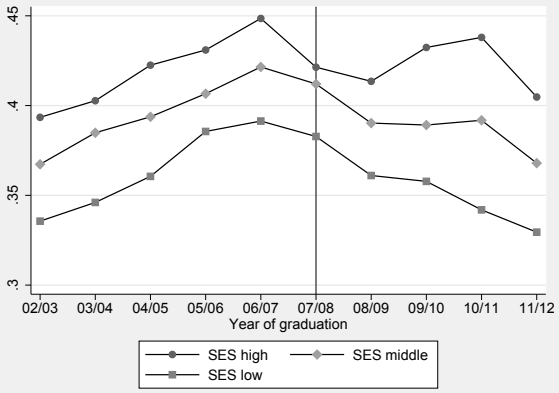
(b) Professional job



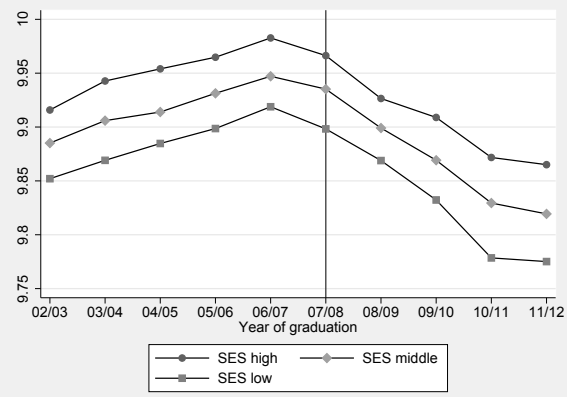
(c) Graduate job



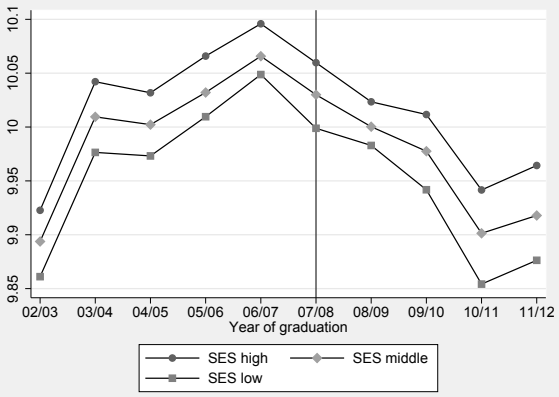
(d) Fixed-term (<12 months)



(e) Salary (ln)



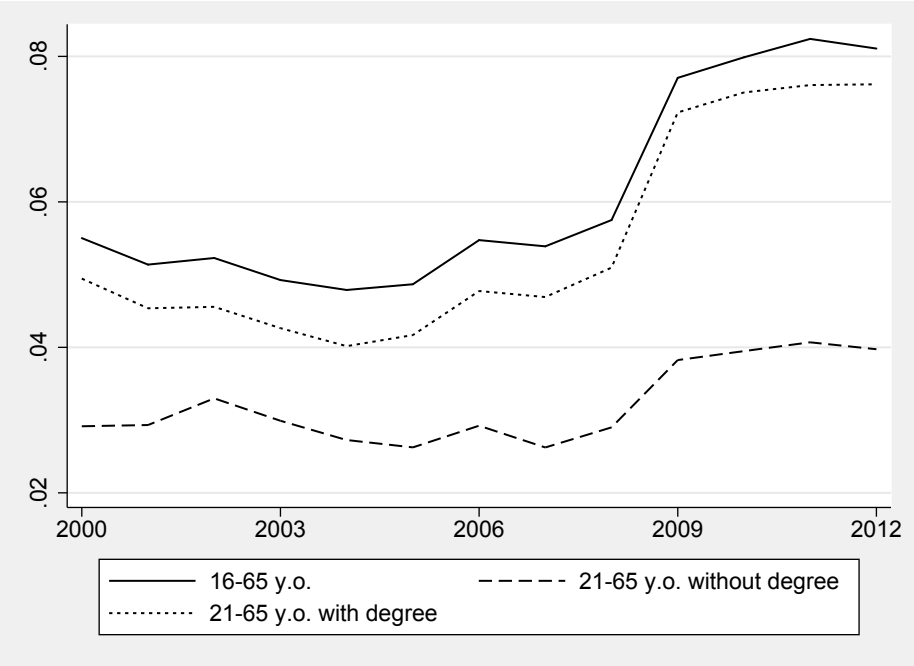
(f) Salary (ln) imputed



Notes.

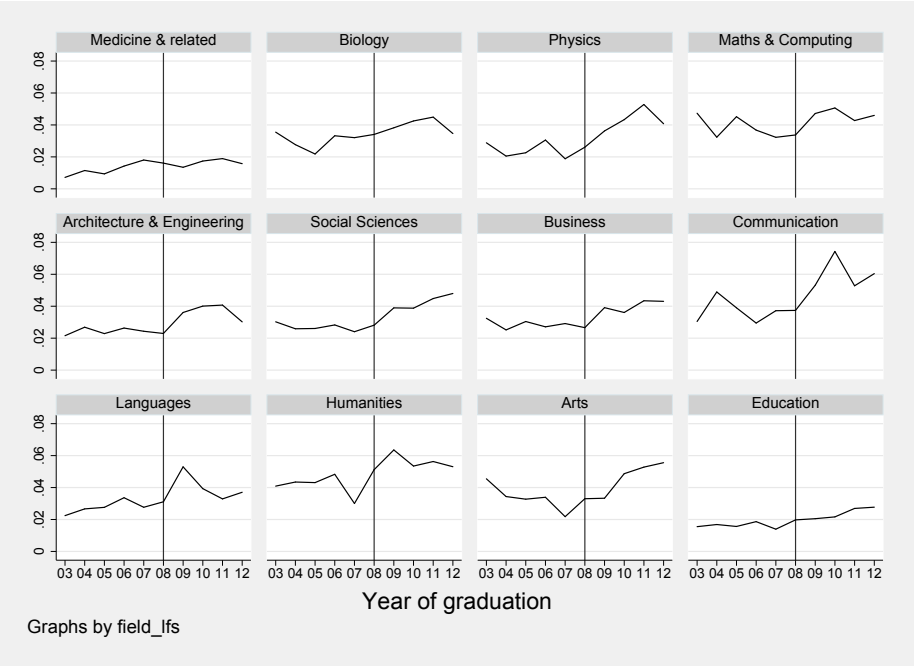
DLHE data on the selected sample described in Section 4.2. The variables are described in Section 4.4.

Figure 4: Unemployment rate by graduate/non-graduate population



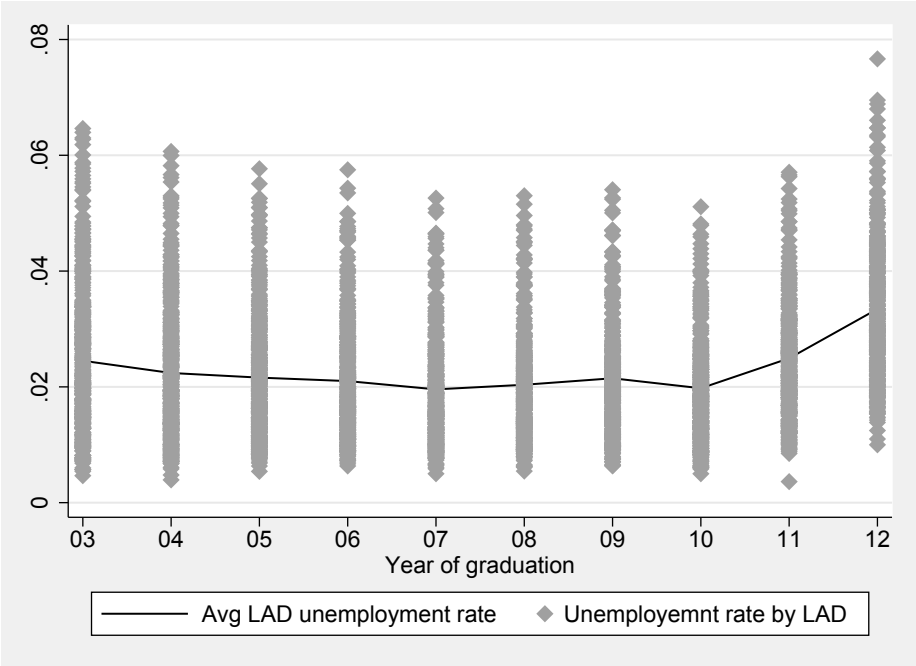
Notes. Derived from the Annual Population Survey/Labour Force Survey.

Figure 5: Graduate unemployment rate by field of study



Notes. Derived from the Annual Population Survey/Labour Force Survey.

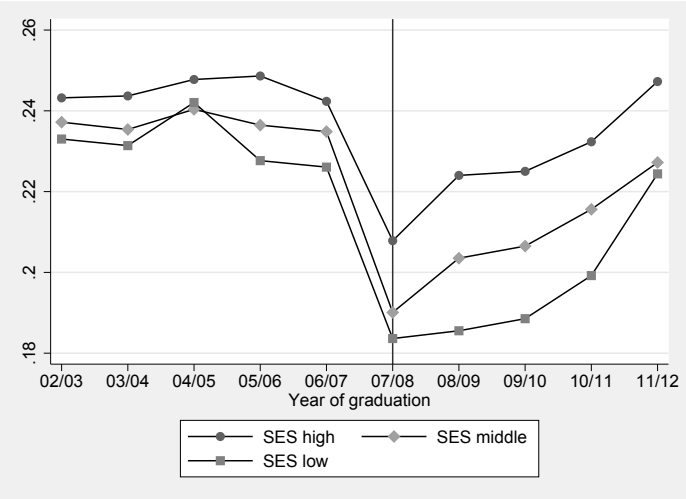
Figure 6: Unemployment rate between and within LAD



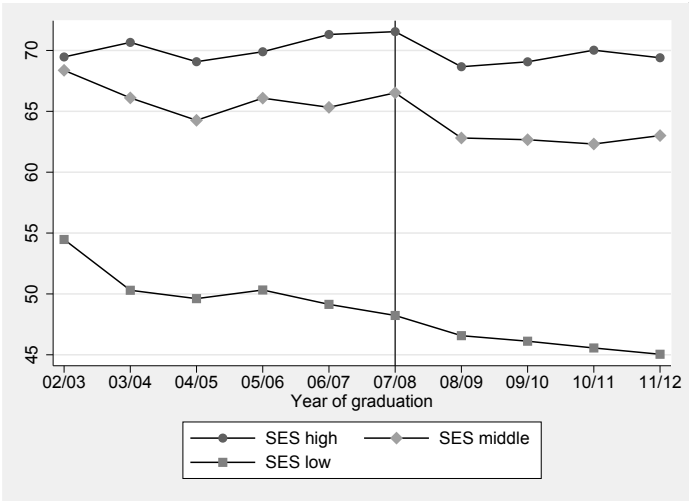
Notes. The unemployment rate by LAD is derived from the Claimant Count.

Figure 7: Mechanisms

(a) Job found through social network



(b) Distance work-home (Km)



Notes. DLHE data on the selected sample described in Section 4.2. The variables are described in Section 6.

Table 1: Summary statistics of main explanatory variables

	High SES		Middle SES		Low SES	
	Mean	*sd*	*Mean*	*sd*	*Mean*	*sd*
Female	0.531	0.499	0.554	0.497	0.579	0.494
Ethnicity						
White	0.900	0.301	0.837	0.369	0.700	0.458
Caribbean	0.002	0.042	0.008	0.089	0.022	0.146
African	0.003	0.050	0.009	0.093	0.031	0.173
Other Black	0.001	0.023	0.002	0.040	0.004	0.064
Indian	0.032	0.176	0.059	0.235	0.073	0.260
Pakistani	0.007	0.081	0.017	0.130	0.062	0.242
Bangladeshi	0.002	0.042	0.005	0.072	0.028	0.165
Chinese	0.007	0.086	0.010	0.101	0.016	0.124
Other Asian	0.007	0.084	0.010	0.098	0.011	0.105
Other (incl. mixed)	0.026	0.158	0.030	0.171	0.039	0.195
Unknown	0.015	0.122	0.014	0.116	0.013	0.113
Any disability	0.096	0.295	0.084	0.277	0.075	0.263
Classification degree						
First class honour	0.153	0.360	0.141	0.348	0.112	0.315
Upper second	0.552	0.497	0.525	0.499	0.478	0.500
Lower second	0.228	0.419	0.266	0.442	0.328	0.469
Third/Pass	0.031	0.173	0.040	0.195	0.057	0.232
Unclassified	0.036	0.187	0.029	0.168	0.026	0.158
Field of study						
Medicine & related	0.081	0.272	0.078	0.269	0.081	0.272
Biology	0.104	0.306	0.113	0.317	0.118	0.323
Physics	0.061	0.239	0.057	0.232	0.046	0.210
Maths & Computing	0.060	0.237	0.071	0.257	0.088	0.283
Architecture & Engineering	0.080	0.271	0.072	0.259	0.061	0.239
Social Sciences	0.152	0.359	0.143	0.351	0.151	0.358
Business	0.113	0.317	0.117	0.322	0.127	0.333
Communication	0.032	0.177	0.037	0.189	0.041	0.199
Languages	0.098	0.297	0.083	0.276	0.067	0.250
Humanities	0.074	0.261	0.061	0.240	0.046	0.209
Arts	0.116	0.321	0.126	0.332	0.124	0.330
Education	0.029	0.169	0.041	0.197	0.050	0.217
HEI group						
Non-grouped	0.286	0.452	0.298	0.458	0.254	0.435
Russell	0.285	0.451	0.201	0.401	0.139	0.346
Golden	0.093	0.291	0.066	0.248	0.036	0.186
Ex-polytechnics	0.055	0.228	0.077	0.266	0.114	0.317
Alliance	0.201	0.400	0.238	0.426	0.303	0.459
Million Plus	0.039	0.194	0.067	0.251	0.108	0.310
Guild	0.041	0.199	0.052	0.222	0.047	0.212
Distance domicile-HEI (Km)	128.975	98.805	111.429	98.129	77.283	89.076
N	267,184		577,989		209,690	

Notes. Summary statistics of graduates' characteristics in the sample described in Section 4.2.

Table 2: The effect of graduating in bad times by SES - Activity status

A.	HE programme			Professional programme		
	1	2	3	1	2	3
Middle SES	0.003	0.002	0.002	0.001	0.001	0.001
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Low SES	0.005+	0.004	0.003	0.009*	0.010**	0.010**
	(0.003)	(0.003)	(0.003)	(0.004)	(0.004)	(0.004)
ln(U field) * Middle SES	-0.002	-0.002	-0.002	0.009**	0.009**	0.009**
	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)
ln(U field) * Low SES	-0.007*	-0.007*	-0.007*	0.023**	0.024**	0.024**
	(0.003)	(0.003)	(0.003)	(0.005)	(0.005)	(0.005)
ln(U field)	0.009+	0.009*	0.005	-0.014*	-0.011*	-0.009+
	(0.005)	(0.004)	(0.003)	(0.006)	(0.005)	(0.004)
$\overline{y}$		0.078			0.073	
B.	Full-time job			Part-time job		
	1	2	3	1	2	3
Middle SES	0.015**	0.015**	0.015**	-0.003	-0.002	-0.002
	(0.004)	(0.004)	(0.004)	(0.002)	(0.002)	(0.002)
Low SES	0.007	0.008	0.010	-0.004	-0.003	-0.003
	(0.008)	(0.008)	(0.008)	(0.003)	(0.003)	(0.003)
ln(U field) * Middle SES	-0.009+	-0.009+	-0.009*	0.010**	0.009**	0.009**
	(0.005)	(0.005)	(0.005)	(0.002)	(0.002)	(0.002)
ln(U field) * Low SES	-0.029**	-0.028**	-0.028**	0.019**	0.018**	0.018**
	(0.010)	(0.010)	(0.010)	(0.004)	(0.004)	(0.004)
ln(U field)	-0.030+	-0.042**	-0.013	0.010	0.013*	0.005
	(0.015)	(0.012)	(0.012)	(0.007)	(0.006)	(0.007)
$\overline{y}$		0.527			0.101	
C.	Unemployed			Other		
	1	2	3	1	2	3
$\overline{y}$		0.078			0.076	
Middle SES	0.000	0.000	0.000	-0.015**	-0.015**	-0.015**
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Low SES	0.001	0.001	0.001	-0.020**	-0.020**	-0.021**
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
ln(U field) * Middle SES	0.002	0.002	0.002	-0.009**	-0.009**	-0.009**
	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)
ln(U field) * Low SES	0.011**	0.011**	0.011**	-0.017**	-0.018**	-0.018**
	(0.003)	(0.003)	(0.003)	(0.004)	(0.004)	(0.004)
ln(U field)	0.011*	0.014**	0.001	0.014*	0.016**	0.010*
	(0.004)	(0.004)	(0.005)	(0.006)	(0.006)	(0.005)
$\overline{y}$		0.076			0.144	
Obs.			1,054,863			
Individual characteristics	x	x	x	x	x	x
HEI FE	x	x	x	x	x	x
Classification degree	x	x	x	x	x	x
Field of study	x	x	x	x	x	x
ln(U enrolment)	x	x	x	x	x	x
ln(U enrolment)*SES	x	x	x	x	x	x
SES-specific time trends	x	x	x	x	x	x
Time trend	x	x		x	x	
Field specific-time trend		x	x		x	x
Year of graduation dummy			x			x

Notes. Individual characteristics: cohort, gender, ethnicity, any disability, distance home-HEI, distance home-HEI squared, LAD dummies. Robust standard errors are clustered by field of study and year of graduation in parentheses. Significance at 1%, 5%, and 10%- level are indicated by **, *, and +.

Table 3: The effect of graduating in bad times by SES - Job quality

	Part-time vs full-time job	Professional occupation	Graduate job	Fixed term contract	(ln) Salary
Middle SES	-0.005	-0.014*	0.001	-0.011**	-0.007+
	(0.003)	(0.005)	(0.005)	(0.004)	(0.004)
Low SES	-0.002	-0.031**	-0.010	-0.019**	-0.014*
	(0.006)	(0.009)	(0.008)	(0.005)	(0.006)
ln(U field) * Middle SES	0.015**	-0.023**	-0.010+	-0.004	-0.007+
	(0.004)	(0.005)	(0.005)	(0.003)	(0.004)
ln(U field) * Low SES	0.037**	-0.045**	-0.016+	-0.005	-0.018**
	(0.007)	(0.009)	(0.009)	(0.004)	(0.006)
ln(U field)	0.025**	-0.037**	-0.040**	0.005	-0.049**
	(0.009)	(0.010)	(0.010)	(0.006)	(0.009)
$\overline{y}$	0.160	0.611	0.394	0.101	9.889
Obs.	662,081	661,210	555,265	579,816	291,991

Notes. RHS variables not included in the table: (ln) U at enrolment, interaction between SES categories and (ln) U at enrolment, cohort, gender, ethnicity, any disability, degree classification, distance home-HEI, distance home-HEI squared, HEI dummies, LAD dummies, field of study dummies, linear time trend, SES-specific time trends, and field-specific time trends. Robust standard errors are clustered by field of study and year of graduation in parentheses. Significance at 1%, 5%, and 10%- level are indicated by **, *, and +.

Table 4: Quantifying the contribution of the recession to the SES gap

	$\overline{y^{2003-07}}$	$\overline{y^{2008-12}}$	Δ *SES gap*	$\hat{\delta}$	*Contrib*	*% contrib*
HE programme						
High SES	0.0804	0.0957				
Low SES	0.0629	0.0663				
	0.0175	0.0294	0.0120			
				-0.0070	0.0025	20%
Unemployment						
High SES	0.0509	0.0838				
Low SES	0.0732	0.1160				
	-0.0223	-0.0322	0.0099			
				-0.0280	0.0098	99%
Part-time vs. full-time job						
High SES	0.0975	0.1609				
Low SES	0.1570	0.2559				
	-0.0595	-0.0950	0.0355			
				0.0370	0.0130	36%
Professional occupation						
High SES	0.6346	0.6624				
Low SES	0.5597	0.5624				
	0.0749	0.1000	0.0252			
				-0.0450	0.0158	63%

Notes. The first two columns report the SES gap with respect to the outcome of reference (HE programme, unemployment, working part-time vs. full-time, and working in a professional occupation) for the cohorts who graduated before and after the Great Recession, respectively. The third column reports the difference in the SES gap before/after the Great Recession. $\hat{\delta}$ is the estimated coefficient of the interaction of the low SES dummy with the (ln) of the unemployment rate at graduation. *Contrib* indicates the change in the SES gap across the period before/after the Great Recession (i.e. $(\hat{\delta}/100)*35$). *% contrib* is the equivalent of *Contrib* / Δ *SES gap*, i.e. how much of the change in the SES gap can be explained in our model by the increase in the unemployment rate.

Table 5: Heterogeneity: activity status

	Full-time job	Part-time job	HE programme	Professional programme	Unemployed	Other
A Gender						
ln(U field) * Middle SES * Female	0.005	0.006+	-0.008	0.006+	-0.002	-0.008
	(0.003)	(0.003)	(0.007)	(0.004)	(0.003)	(0.005)
ln(U field) * Low SES * Female	0.008+	0.004	-0.000	0.005	-0.011*	-0.006
	(0.005)	(0.005)	(0.008)	(0.004)	(0.004)	(0.005)
B HEI quality (Golden Triangle)						
ln(U field) * Middle SES * Best HEI	0.010	0.005	-0.008	-0.005	0.001	-0.003
	(0.007)	(0.006)	(0.007)	(0.004)	(0.004)	(0.005)
ln(U field) * Low SES * Best HEI	0.008	0.031**	-0.014	-0.012+	-0.008	-0.005
	(0.011)	(0.011)	(0.011)	(0.006)	(0.007)	(0.009)
C Field of study (whether STEM)						
ln(U field) * Middle SES * STEM	0.006	0.017**	-0.019**	0.009	0.002	-0.014**
	(0.004)	(0.005)	(0.007)	(0.005)	(0.003)	(0.005)
ln(U field) * Low SES * STEM	0.011+	0.022**	-0.045**	0.017**	0.006	-0.011+
	(0.006)	(0.007)	(0.013)	(0.007)	(0.005)	(0.006)
Obs.	1,054,863					

Notes. RHS variables not included in the table: (ln) U at graduation, SES index dummies and their interactions with the variable of interest (female/best HEI/STEM), (ln) U at enrolment, interaction between SES categories and (ln) U at enrolment, cohort, gender, ethnicity, any disability, degree classification, distance home-HEI, distance home-HEI squared, HEI dummies, LAD dummies, field of study dummies, linear time trend, SES-specific time trends, and field-specific time trends. Robust standard errors are clustered by field of study and year of graduation in parentheses. Significance at 1%, 5%, and 10%- level are indicated by **, *, and +.

Table 6: Heterogeneity: job quality

	Part-time vs full-time job	Professional occupation	Graduate job	Fixed term contract	(ln) Salary
A Gender					
ln(U field) * Middle SES * Female	0.009+	-0.015*	-0.011	-0.002	-0.007
	(0.005)	(0.007)	(0.007)	(0.005)	(0.006)
ln(U field) * Low SES * Female	0.005	0.008	0.010	-0.006	-0.017*
	(0.006)	(0.010)	(0.011)	(0.007)	(0.008)
B HEI quality (Golden Triangle)					
ln(U field) * Middle SES * Best HEI	-0.003	0.003	0.008	-0.003	-0.009
	(0.006)	(0.009)	(0.010)	(0.011)	(0.009)
ln(U field) * Low SES * Best HEI	-0.011	-0.001	0.018	0.020	-0.005
	(0.010)	(0.015)	(0.017)	(0.020)	(0.014)
C Field of study (whether STEM)					
ln(U field) * Middle SES * STEM	0.016+	-0.009	0.013	0.011+	0.004
	(0.008)	(0.009)	(0.010)	(0.006)	(0.008)
ln(U field) * Low SES * STEM	0.032**	-0.030*	-0.028+	0.030**	0.001
	(0.012)	(0.014)	(0.014)	(0.008)	(0.012)
Obs.	662,081	661,210	555,265	579,816	291,991

Notes. RHS variables not included in the table: (ln) U at graduation, SES index dummies and their interactions with the variable of interest (female/best HEI/STEM), (ln) U at enrolment, interaction between SES categories and (ln) U at enrolment, cohort, gender, ethnicity, any disability, degree classification, distance home-HEI, distance home-HEI squared, HEI dummies, LAD dummies, field of study dummies, linear time trend, SES-specific time trends, and field-specific time trends. Robust standard errors are clustered by field of study and year of graduation in parentheses. Significance at 1%, 5%, and 10%- level are indicated by **, *, and +.

Table 7: The effect of graduating in bad times by SES - Mechanisms

	I Social network (0/1)	II Distance work-home (Km)		
	whole sample	whole sample	network=1	network=0
Middle SES	-0.006	1.407	1.495	2.026+
	(0.004)	(1.041)	(1.700)	(1.129)
Low SES	-0.019**	2.023	0.213	1.842
	(0.006)	(1.491)	(2.132)	(1.542)
ln(U field) * Middle SES	-0.010*	3.557**	2.891	2.744**
	(0.004)	(0.734)	(1.830)	(0.933)
ln(U field) * Low SES	-0.034**	7.808**	3.410	6.310**
	(0.005)	(1.100)	(2.183)	(1.378)
ln(U field)	0.010	-6.027**	-3.343	-4.135**
	(0.008)	(1.062)	(2.309)	(1.173)
$\overline{y}$	0.223	63.165	53.929	64.498
Obs.	536,926	621,682	111,476	395,007

Notes. RHS variables not included in the table: (ln) U at enrolment, interaction between SES categories and (ln) U at enrolment, cohort, gender, ethnicity, any disability, degree classification, distance home-HEI, distance home-HEI squared, HEI dummies, LAD dummies, field of study dummies, linear time trend, SES-specific time trends, and field-specific time trends. Robust standard errors are clustered by field of study and year of graduation in parentheses. Significance at 1%, 5%, and 10%-level are indicated by **, *, and +. The first two columns consider the whole sample of graduates, while column 3 and 4 restrict the population of graduates to those who found their job through social network and through any other channels, respectively.

Table 8: Conditioning on pre-university academic attainment: activity status

	Full-time job	Part-time job	HE programme	Professional programme	Unemployed	Other
Q1	0.007**	-0.016*	-0.011	0.021**	0.017**	-0.019**
	(0.002)	(0.006)	(0.007)	(0.002)	(0.002)	(0.003)
Q2	0.001	-0.018**	0.010*	0.013**	0.010**	-0.016**
	(0.002)	(0.005)	(0.005)	(0.002)	(0.001)	(0.002)
Q3	-0.004+	-0.015**	0.015**	0.011**	0.006**	-0.013**
	(0.002)	(0.004)	(0.004)	(0.002)	(0.001)	(0.002)
Q4	-0.010**	-0.008**	0.016**	0.006**	0.004**	-0.007**
	(0.002)	(0.002)	(0.003)	(0.001)	(0.001)	(0.002)
Middle SES	-0.003	0.002	0.024**	-0.005	-0.003	-0.014**
	(0.004)	(0.004)	(0.006)	(0.003)	(0.003)	(0.003)
Low SES	-0.004	0.019**	0.012	-0.001	0.002	-0.028**
	(0.005)	(0.006)	(0.013)	(0.005)	(0.004)	(0.005)
ln(U field) * Middle SES	-0.005	0.011*	-0.010+	0.010**	0.001	-0.006*
	(0.003)	(0.005)	(0.006)	(0.003)	(0.002)	(0.003)
ln(U field) * Low SES	-0.010+	0.032**	-0.038**	0.020**	0.013**	-0.018**
	(0.005)	(0.006)	(0.013)	(0.004)	(0.003)	(0.004)
ln(U field)	0.016**	-0.014+	-0.054**	0.011*	0.018**	0.023**
	(0.006)	(0.007)	(0.013)	(0.005)	(0.005)	(0.006)
Obs.	687,635	687,635	687,635	687,635	687,635	687,635

Notes. Q1-Q4 are the first four quintiles in which we divided the tariff score (Q5, which group graduates with the highest attainment, is the omitted category). RHS variables not included in the table: (ln) U at enrolment, interaction between SES categories and (ln) U at enrolment, cohort, gender, ethnicity, any disability, degree classification, distance home-HEI, distance home-HEI squared, HEI dummies, LAD dummies, field of study dummies, linear time trend, SES-specific time trends, and field-specific time trends. Robust standard errors are clustered by field of study and year of graduation in parentheses. Significance at 1%, 5%, and 10%- level are indicated by **, *, and +.

Table 9: Conditioning on pre-university academic attainment: job quality

	Part-time vs full-time job	Professional occupation	Graduate job	Fixed term contract	(ln) Salary
Q1	0.030**	-0.067**	-0.059**	-0.005+	-0.036**
	(0.004)	(0.007)	(0.008)	(0.003)	(0.005)
Q2	0.016**	-0.041**	-0.039**	-0.006**	-0.019**
	(0.003)	(0.005)	(0.005)	(0.002)	(0.004)
Q3	0.012**	-0.026**	-0.030**	-0.003	-0.018**
	(0.003)	(0.004)	(0.004)	(0.002)	(0.003)
Q4	0.005*	-0.012**	-0.021**	0.002	-0.011**
	(0.002)	(0.003)	(0.003)	(0.002)	(0.002)
Middle SES	-0.011*	-0.017*	0.001	0.002	-0.007
	(0.005)	(0.009)	(0.010)	(0.005)	(0.006)
Low SES	0.003	-0.041**	-0.018	-0.009	-0.011
	(0.009)	(0.014)	(0.013)	(0.006)	(0.009)
ln(U field) * Middle SES	0.017**	-0.029**	-0.014*	-0.005	-0.007
	(0.004)	(0.005)	(0.006)	(0.004)	(0.005)
ln(U field) * Low SES	0.044**	-0.053**	-0.027**	-0.008*	-0.019**
	(0.008)	(0.010)	(0.010)	(0.004)	(0.006)
ln(U field)	0.029**	-0.025*	-0.027+	0.020**	-0.041**
	(0.009)	(0.012)	(0.014)	(0.007)	(0.011)
Obs.	420,477	419,969	358,060	373,408	189,620

Notes. Q1-Q4 are the first four quintiles in which we divided the tariff score (Q5, which group graduates with the highest attainment, is the omitted category). RHS variables not included in the table: (ln) U at enrolment, interaction between SES categories and (ln) U at enrolment, cohort, gender, ethnicity, any disability, degree classification, distance home-HEI, distance home-HEI squared, HEI dummies, LAD dummies, field of study dummies, linear time trend, SES-specific time trends, and field-specific time trends. Robust standard errors are clustered by field of study and year of graduation in parentheses. Significance at 1%, 5%, and 10%- level are indicated by **, *, and +.

Table 10: Imputed (ln) salary

	6 months	42 months	6 months FT only
Middle SES	-0.006+	-0.014	-0.006+
	(0.004)	(0.017)	(0.004)
Low SES	-0.012+	-0.024	-0.012+
	(0.007)	(0.023)	(0.007)
ln(U field) * Middle SES	-0.007+	-0.022	-0.007+
	(0.004)	(0.022)	(0.004)
ln(U field) * Low SES	-0.017**	-0.061*	-0.017**
	(0.006)	(0.030)	(0.006)
ln(U field)	-0.076**	0.018	-0.076**
	(0.017)	(0.029)	(0.017)
Obs.	606,448	40,081	467,066

Notes. RHS variables not included in the table: (ln) U at enrolment, interaction between SES categories and (ln) U at enrolment, cohort, gender, ethnicity, any disability, degree classification, distance home-HEI, distance home-HEI squared, HEI dummies, LAD dummies, field of study dummies, linear time trend, SES-specific time trends, and field-specific time trends. Robust standard errors are clustered by field of study and year of graduation in parentheses. Significance at 1%, 5%, and 10%- level are indicated by **, *, and +.

Table 11: Non-response

	Non-response
Middle SES	-0.012**
	(0.002)
Low SES	-0.029**
	(0.003)
ln(U field) * Middle SES	0.002
	(0.002)
ln(U field) * Low SES	0.001
	(0.004)
ln(U field)	0.018**
	(0.006)
Obs.	1,301,958

Notes. RHS variables not included in the table: (ln) U at enrolment, interaction between SES categories and (ln) U at enrolment, cohort, gender, ethnicity, any disability, degree classification, distance home-HEI, distance home-HEI squared, HEI dummies, LAD dummies, field of study dummies, linear time trend, SES-specific time trends, and field-specific time trends. Robust standard errors are clustered by field of study and year of graduation in parentheses. Significance at 1%, 5%, and 10%- level are indicated by **, *, and +.

Table 12: Are the 6 months outcomes good indicators of the 3.5 years outcomes?

	Full-time job (42m)		Part-time job (42m)		Unemployed (42m)	
	Pre	Post	Pre	Post	Pre	Post
Part-time work (6m)	-0.091**	-0.130**	0.053**	0.074**	0.023**	0.032**
	(0.018)	(0.019)	(0.009)	(0.009)	(0.008)	(0.009)
Studying (6m)	-0.113**	-0.177**	0.013**	0.020**	0.106**	0.126**
	(0.025)	(0.032)	(0.003)	(0.005)	(0.023)	(0.032)
Unemployed (6m)	-0.104**	-0.137**	0.044**	0.046**	0.012+	0.016+
	(0.014)	(0.015)	(0.008)	(0.006)	(0.006)	(0.007)
Working & Studying (6m)	-0.082**	-0.094**	0.014**	0.025	0.012+	0.020*
	(0.012)	(0.021)	(0.005)	(0.018)	(0.006)	(0.008)
Other (6m)	-0.107**	-0.152**	0.026**	0.063**	0.021**	0.028*
	(0.013)	(0.022)	(0.007)	(0.010)	(0.007)	(0.013)
$\overline{y}$	0.761	0.737	0.040	0.053	0.084	0.104
Obs.	28,772	20,261	28,772	20,261	28,772	20,261

	Studying (42m)		Working & Studying (42m)		Other (42m)	
	Pre	Post	Pre	Post	Pre	Post
Part-time work (6m)	-0.012*	-0.002	0.021*	0.016*	0.007+	0.008
	(0.005)	(0.010)	(0.008)	(0.007)	(0.004)	(0.005)
Studying (6m)	-0.015+	0.004	0.010*	0.021**	0.001	0.005
	(0.008)	(0.006)	(0.004)	(0.004)	(0.003)	(0.004)
Unemployed (6m)	-0.009	-0.010+	0.051**	0.073**	0.006	0.012*
	(0.006)	(0.005)	(0.007)	(0.009)	(0.005)	(0.005)
Working & Studying (6m)	0.054**	0.043**	0.001	0.005	0.000	-0.000
	(0.009)	(0.008)	(0.004)	(0.004)	(0.004)	(0.003)
Other (6m)	0.012	-0.000	0.026**	0.026**	0.020**	0.033**
	(0.010)	(0.010)	(0.006)	(0.008)	(0.006)	(0.007)
$\overline{y}$	0.061	0.049	0.031	0.030	0.023	0.028
Obs.	28,772	20,261	28,772	20,261	28,772	20,261

Notes. RHS variables not included in the table: SES categories, (ln) U at graduation, interaction between SES categories and (ln) U at graduation, (ln) U at enrolment, interaction between SES categories and (ln) U at enrolment, cohort, gender, ethnicity, any disability, degree classification, distance home-HEI, distance home-HEI squared, HEI dummies, LAD dummies, and field of study dummies. Robust standard errors are clustered by field of study and year of graduation in parentheses. Significance at 1%, 5%, and 10%- level are indicated by **, *, and +. The sample is split into students who graduated in the years pre (2003, 2005, and 2007) and post the recession (2009).

Table 13: Outcomes at 3.5 years after graduation

	FT job	PT job	Working & studying	Studying	Unemployed	Other	Prof. job	Master	(ln)Salary
Middle SES	-0.007	0.004	0.000	0.003	-0.001	-0.001	-0.011	-0.007	-0.030*
	(0.008)	(0.004)	(0.004)	(0.004)	(0.003)	(0.003)	(0.011)	(0.013)	(0.012)
Low SES	-0.013	0.009+	0.005	-0.001	-0.003	0.001	-0.019	-0.018	-0.051**
	(0.009)	(0.005)	(0.005)	(0.005)	(0.004)	(0.003)	(0.014)	(0.018)	(0.015)
ln(U field) * Middle SES	0.010	-0.005	-0.004	-0.008	0.006	-0.001	-0.008	0.025+	-0.014
	(0.015)	(0.008)	(0.011)	(0.007)	(0.006)	(0.005)	(0.014)	(0.015)	(0.019)
ln(U field) * Low SES	-0.008	0.004	0.000	-0.009	0.009	0.003	-0.030	0.005	-0.071**
	(0.018)	(0.007)	(0.008)	(0.010)	(0.008)	(0.006)	(0.019)	(0.027)	(0.023)
ln(U field)	-0.000	0.000	-0.009	0.017	-0.006	-0.001	-0.003	0.034+	-0.073**
	(0.021)	(0.008)	(0.010)	(0.013)	(0.007)	(0.006)	(0.027)	(0.018)	(0.021)
$\overline{y}$	0.504	0.801	0.934	0.176	0.827	0.634	0.361	0.295	9.907
Obs.	49,033	49,033	49,033	49,033	49,033	49,033	33,994	21,255	18,168

Notes. RHS variables not included in the table: (ln) U at enrolment, interaction between SES categories and (ln) U at enrolment, cohort, gender, ethnicity, any disability, degree classification, distance home-HEI, distance home-HEI squared, HEI dummies, LAD dummies, and field of study dummies. Robust standard errors are clustered by field of study and year of graduation in parentheses. Significance at 1%, 5%, and 10%- level are indicated by **, *, and +.

Table 14: Regret and career satisfaction at 3.5 years after graduation

	Change subject	Change institution
Middle SES	0.002	-0.017
	(0.021)	(0.015)
Low SES	0.003	-0.058**
	(0.024)	(0.020)
ln(U field) * Middle SES	0.035	-0.003
	(0.042)	(0.022)
ln(U field) * Low SES	0.080*	-0.046
	(0.038)	(0.030)
ln(U field)	0.007	0.028
	(0.054)	(0.039)
Obs.	47,951	47,173
	Change qualification	Career satisfaction
Middle SES	0.026+	-0.021
	(0.015)	(0.015)
Low SES	0.033	-0.074**
	(0.020)	(0.018)
ln(U field) * Middle SES	-0.010	-0.026
	(0.032)	(0.029)
ln(U field) * Low SES	0.015	-0.065*
	(0.036)	(0.030)
ln(U field)	0.011	0.041
	(0.052)	(0.040)
Obs.	47,639	48,364

Notes. RHS variables not included in the table: (ln) U at enrolment, interaction between SES categories and (ln) U at enrolment, cohort, gender, ethnicity, any disability, degree classification, distance home-HEI, distance home-HEI squared, HEI dummies, LAD dummies, and field of study dummies. Robust standard errors are clustered by field of study and year of graduation in parentheses. Significance at 1%, 5%, and 10%- level are indicated by **, *, and +.

Table A1: Sample selection

Overall number of observations for DLHE years 2002/3-2011/2 N=4,680,237
Keep if first degree graduates (-1,810,741)
Keep if studied full-time (-303,859)
Keep 21-24 years old in June (-483,557)
Initial sample N=2,082,080
Keep UK nationals (-296,177)
Keep if not from Isle of Man, Guernsey, Jersey (-5,164)
Keep only English universities (-288,450)
Intermediate sample N=1,492,289
Drop if subject studied is undefined (-8,665)
Drop if there is no subject studied at least 50% (-6,440)
Drop if the subject has no correspondent in the LFS (-15,651)
Drop if postcode of domicile unknown (-6,865)
Drop if LPN and/or school type missing (-152,709)
Drop if non-respondent (-247,095)
Drop if gender other than male or female (-1)
Final sample N=1,054,863

A1 University groups

- *Golden Triangle Group*: elite universities located in the southern English cities of Cambridge, London and Oxford. These universities belong to the Russell Group as well but we do not include them in that group in our analysis to avoid overlapping definitions.
  The University of Cambridge, The University of Oxford, University College London, Imperial College London, King's College London, London School of Economics and Political Science.

- *Russell Group*: prestigious British public research universities.
  The University of Birmingham, The University of Bristol, University of Durham, The University of Exeter, The University of Leeds, The University of Liverpool, Queen Mary and Westfield College, The University of Newcastle-upon-Tyne, The University of Nottingham, The University of Sheffield , The University of Southampton, The University of Warwick, The University of York, The University of Manchester.

- *Ex-Polytechnics*: tertiary education teaching institutions turned into independent universities with the Further and Higher Education Act 1992. Most of these universities also belong to the groups below (University Alliance, Million Plus, and Guild HE), but we have grouped them there only to avoid overlapping definitions.
  The University of Brighton, The University of Central Lancashire, Leeds Metropolitan University, De Montfort University, London South Bank University, The University of Westminster, The University of Wolverhampton.

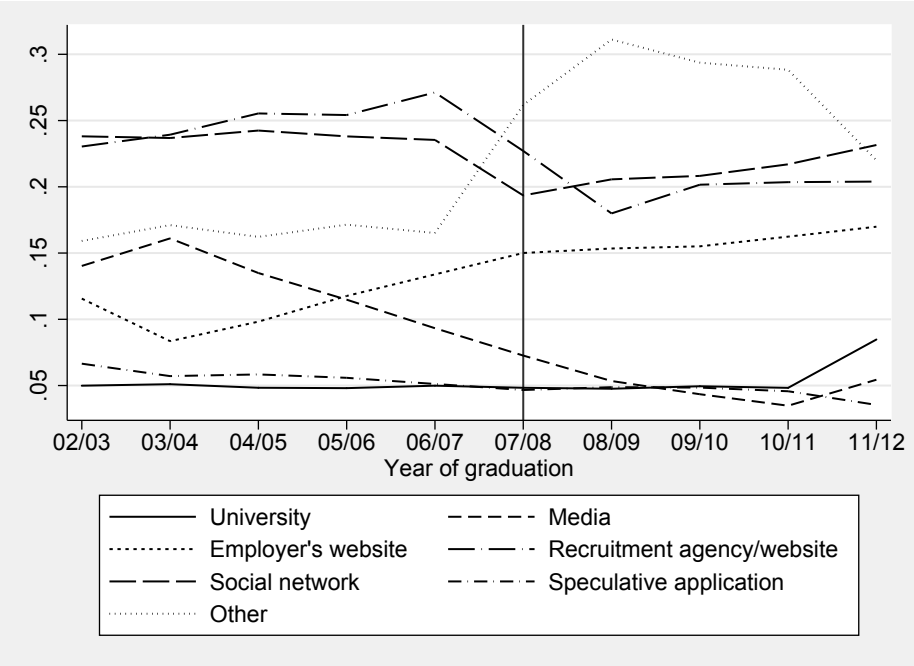
- *University Alliance*: group of 'business engaged' universities that claim to drive innovation and enterprise growth through research and teaching.
  Bournemouth University, Coventry University, The University of Greenwich, University of Hertfordshire, The University of Huddersfield, The University of Lincoln, Kingston University, Liverpool John Moores University, The Manchester Metropolitan University, The University of Northumbria at Newcastle, The Nottingham Trent University, Oxford Brookes University, The University of Plymouth, The University of Portsmouth, Sheffield Hallam University,

Teesside University, University of the West of England Bristol, The University of Bradford, The University of Salford.

- *Million Plus*: group of universities (mainly ex-polytechnics and university colleges) forming a think-tank, seeking to solve complex problems in the Higher Education sector.
  Canterbury Christ Church University, University of Bedfordshire, University of Cumbria, Anglia Ruskin University, Bath Spa University, The University of Bolton, Birmingham City University, The University of East London, Middlesex University, Staffordshire University, The University of Sunderland, The University of West London, London Metropolitan University.

- *Guild HE*: some of the most recently designated universities and university colleges, specialist colleges and other bodies providing Higher Education programs.
  York St John University, University College Plymouth St Mark and St John, University College Falmouth, The University of Winchester, Southampton Solent University, St Mary's University College Twickenham, Leeds Trinity University College, The University of Worcester, The University of Chichester, Writtle College, Royal Agricultural College, University College Birmingham, University for the Creative Arts, The Liverpool Institute for Performing.

Figure A1: Job found through...



Notes. Different methods through which graduates found their job by cohort.