Charging for Higher Education: Estimating the Impact on Inequality and Student Outcomes*

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Abstract

Over the last two decades, undergraduate university education in England moved from being state-funded and free for students, to costing all students substantial amounts in tuition fees. In this paper, using detailed administrative longitudinal microdata that follow all students attending state schools in England (approximately 95 percent of student population), we causally show that, despite the substantial reforms, enrollment fell only by 0.5 percentage points, where the effect is largely borne by those in wealthier groups, reducing the enrolment gap across socio-economic groups. Since tuition fees were introduced in conjunction with the government offering generous means-tested maintenance (cash) grants, as well as loans, our results highlight the importance of reducing financing constraints. Beyond enrollment, we find that the reforms have limited impact on students' higher education choices, such as relocation decisions, university choice, and field of study. Finally, by tracking the students after graduation, we show similarly small effects on labor market outcomes.

JEL codes: I22, I23, I29, J30

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1 Introduction

Higher education funding has become one of the most highly debated public policies of recent times. The extent of cross-country variation in the tuition fees charged and the degree of (and conditions for) means-tested financial support is remarkable (OECD (2011)), from no tuition fees and generous financial support in Nordic countries, to moderate tuition fees and low levels of financial support in many continental European countries, and to high tuition fees and generous financial support in parts of the US and UK. Over the last 20 years, many OECD countries have observed reforms in their funding schemes, while many others are considering future reforms. A number of studies highlight the distributive consequences of the moving to a fee-paying system (Hearn and Longanecker (1985), Looney and Yannelis (2015), Chakrabarti, Fos and Liberman (2020)), largely because of the differential financing constraints across socio-economic groups and the implied debt of shifting the burden onto students.

Over the last two decades, England has implemented a series of changes in the funding of higher education, reducing the amount of direct public expenditure on higher education from 80 percent to approximately 25 percent (see Figure 1) and becoming one of the most generous in providing access to public loans, scholarships and grants (see Figure 2). The national reforms in England are a good laboratory to provide additional evidence to this debate. Several features of the reforms make it an ideal setting. First, until 1998, full-time undergraduate education in public universities in England was free of charge to students. The government then introduced, and substantially increased, tuition fees through three major reforms in 1998, 2006 and 2012 – initially means-tested at £1,000 per year, increasing to £3,000 per year in 2006 for all students and then eventually increasing to £9,000 in 2012. Second, there was a substantial easing of financing constraints. The introduction of a loan system that allowed students to (annually) borrow up to the fee amount. Moreover, support to low-income students, including means-tested grants of up to £3,700 per year and means-tested loans of up to £5,000 per year, were introduced. Third, the coverage of this system was almost universal, since most universities in England are public universities. Finally, the fee regime and amounts were homogeneous across all individuals and institutions, such that it did not induce additional sorting, this being a factor important to determine distributional issues.

In this paper, we use detailed administrative longitudinal data on all students in state schools in England to estimate the short- and longer-term effects of the 2006 reform, as well as some short-run effects of the 2012 reform. The paper provides a comprehensive analysis of the educational and labor market consequences of the English higher education reforms, focusing on its socio-economic distributional effects. Following several cohorts of high-school-aged students (93 percent of all English school-aged students), we link the data to those entering university and then, eventually – for a sizeable subset of students – track them into the labor market. We causally estimate the effect by comparing similar cohorts of students,

before and after the changes in the reforms. Using information at the school level, as well as at the neighborhood level, allows us to match individuals at a highly localized level. We complement this analysis with a differences-in-differences model using (less detailed) administrative data on the university enrollment of English and Scottish students over the same period. While students in England experienced substantial changes in the funding of higher education, students in Scotland do not have to pay any tuition fees. We use a long pre-treatment administrative data to test for pre-treatment trends and the validity of the differences-in-differences estimation.

The reforms, taken together, aimed to shift the burden of higher education funding from the taxpayer to the beneficiary – the students themselves. However, depending on students' household finances – before entering college and after graduating – the extent of this shift is ambiguous. Beyond the system of government means-tested grants and loans, all students, irrespective of household income, had access to credit up to the amount of the tuition fees from the "Student Loan Company", a nonprofit government-owned organization. Tuition fees were only required to be repaid once the student earned above a certain income threshold. The reform, therefore, unambiguously increased the cost of education among those from high-income households, who could not access means-tested support and then earned a high enough income to repay their student loans. However, the effects are likely small, given that there are no competitive alternatives and students from these households are unlikely to be highly sensitive to a change in the price of education. For students from middle- and lower-income households, there was some redistribution and a relaxing of financing constraints with access to additional loans. The overall effect of the reform is, therefore, not obvious, as although all students were obliged to pay tuition fees, there was progressivity in upfront costs through increases in means-tested grants and protection against personal bankruptcy due to student loans. In the paper, we focus on the distributional effects by socio-economic status and we also apply a weighted estimation strategy to understand the differential effects of the changes in various reform components (tuition fees and means-tested maintenance (cash) grants).

Finally, we analyze the impact of the reform changes on several other margins, conditional on enrolling. In particular, we focus on location and university choice, as well as field of study and performance in college, such as length of program completion. These can be important from the perspective of how students sort into colleges. For instance, as is common in the US, a sizeable proportion of students from England relocate to a different part of the country to pursue their college education. A student's choice to relocate often takes into account the quality of the institution or program, as well as the cost of living. The decision to enter college, as well as the decisions made related to college, often have an impact on later labor market outcomes. We link the impact of the reform to later outcomes in the labor market, including their employment status, type of contract and earnings. For the 2012 reform, we analyze the effects on the extensive margin. For all of the analyses, we focus on the (socio-economic) distributional effects.

Overall, our study finds only very modest effects of reforms on both the "intensive" and "extensive" margins, which contrast with the large budget savings. This is confirmed with the differences-in-differences analysis, comparing students in England and Scotland. There is, however, some heterogeneity by socio-economic group. Moreover, when looking more closely at the various margins of adjustment, such as the likelihood to have access to an (unconditional) cash grant, we see differential impacts of the different components of the reform. With respect to enrollment, we find a reduction in the participation gap between those entering university from higher and lower socio-economic groups. There is a small decrease (around 0.5 percentage point) in participation in response to the 2006 reform. However, this modest reduction is only present for the highest socio-economic group, while the participation effect for students from medium and lower socio-economic groups is negligible.

Since means-tested grants and changes in fees differ depending on students' household income, we complement the analysis, by using a weighted estimation strategy to understand the effects of the changes in different components (tuition fees and means-tested maintenance (cash) grants). We find that, while an increase in tuition without the possibility of access to financial aid reduces the probability to enroll (-0.5 percentage points), the likelihood of full financial aid increases the probability to enroll by 0.8 percentage points. The gap lies within these bounds for those likely to be eligible for partial aid. This highlights offsetting effect from the different components of the reform, suggesting that increases in maintenance grant are an important explanation for the closing enrollment gap across socio-economic groups.

With respect to other higher education related choices, we similarly find only small effects of the reform. There is a small reduction in the distance travelled, suggesting that students might compensate for increased tuition by reducing costs in other dimensions. However, looking across students from different socio-economic groups, we find that students from lower socio-economic group actually increase the distance from home to college following the reform. While we do not find a significant effect of the reform on the college choice or field of study by socio-economic groups, we find that those from lower socio-economic group select into relatively worse-quality institutions and pursue a field of study with a lower (expected) return. Tracking the students into the labor market, we observe marginally improved labor outcomes – in terms of employment status, type of contract, earnings – for those from higher-income households and marginally worse for those from lower-income households.

The possible mechanism behind the results points towards an effect of reduced (short-run) financing constraints for the lower socio-economic group outweighing future holding of debt. This effect is not strong enough to change the decision to enter university but can influence some choices and act as a greater willingness to take more"risks" (e.g., with course choice), leading to reduced educational sorting. This difference transmits to labor market outcomes. Among the higher socio-economic group, education does become more costly and has a (small) impact on entry decision. This too is reflected in the (small) improvements in

outcomes when in college and in the labor market, which could be explained by the better selection.

Overall, however, the most compelling finding is that these extensive reforms in funding higher education had only a small overall economic impact on student enrollment and other outcomes, with little (socio-economic) distributional effect. The heterogeneous effects do suggest that introducing progressivity in fees and releasing financing constraints have some differential effect across socio-economic groups and, if anything, reduce the college participation gap.

The education literature has largely focused on the effect of an increase (or decrease) in the cost of college on university enrollment. In the US, studies have shown that a $1,000 increase in fees decreased enrollment between zero and three percentage points and that a $1,000 increase in financial support increased enrollment between zero and six percentage points (Dynarki (2003); McPherson and Schapiro (1991); Kane (1995); Cameron and Heckman (2001)).[1] Similarly, for Europe, a €1,000 increase in fees lowered the enrollment rate by 0.5 to 4.7 percentage points (Kelchetermans and Verboven (2010), for Netherlands; Hubner (2012), for Germany and Nielsen, Sorensen and Taber (2010) for Denmark).[2] Chapman and Ryan (2005) show that in Australia, tuition fee income-contingent loans did not decrease the higher education participation rates of students from low income families. For the UK, Dearden, Fitzsimons and Wyness (2014) show that a £1,000 increase in financial support increased enrollment by 3.95 percentage points, while Sa (2019) shows that a £1,000 increase in tuition fees decreased applications to university by 1.6 percent.[3] In our study, we

[1]Dynarki (2003) uses a differences-in-differences approach to investigate the effects of an elimination of a student benefit program in the US in 1982 on university attendance. The findings suggest a surge of $1,000 in the grant triggered an increased probability of attending college by around 3.6 percentage points. McPherson and Schapiro (1991) also focus on the US case and find that increases in the net cost of attendance had a negative and statistically significant effect on enrollment rates for white low-income families: a $1,000 increase in the net costs decreased enrollment by 6.8 percentage points (for both public and private institutions) or by 6 percentage points (for private institutions). Kane (1995) further analyzes the role of increases in public tuition in the US on enrollment by exploiting different sources of variation in university costs. He finds that a $1,000 drop in tuition fees produced about a 4 percentage point increase in college enrollment. Cameron and Heckman (2001) find that a $1,000 increase in Pell grant entitlements triggered less than a 1% increase in enrollments, while a $1,000 increase in tuition fees produced a drop of around 6% in enrollments in 2 year colleges, but no effect on enrollment in 4-year colleges.

[2]Kelchetermans and Verboven (2010) analyze the university participation decision, where to attend, and what to study in the region of Flanders. The nested model estimates show that a uniform increase in tuition fees had a small effect on overall participation (only around 0.5 percentage points), but differential tuition fees implied large substitutions effects across institutions and fields of study. Hubner (2012) explores the effect of the introduction of tuition fees in sixteen German states in 2007 on enrollment rates. The differences-in-differences results show that the introduction of the fees at an annual rate of €1,000 reduced enrollment by 2.7 percentage points, and once the spill-overs are controlled for, the estimated effect increased to around 4.7 percentage points. Nielsen, Sorensen and Taber (2010) estimate the effect on university enrollment of a change in student aid due to a Danish reform affecting students starting college in 1988 and find that a $1,000 increase in the stipend increased enrollment rates by 1.35 percentage points.

[3]Dearden, Fitzsimons and Wyness (2014) use data from the British Labour Force Survey between 1993 and 2006 on university participation to analyze the impacts of tuition fees and maintenance grants on university enrollment. They find that a £1,000 increase in fees led to a drop in participation of 3.9 percentage points. Sa (2019) uses aggregate data to explore variation over time, comparing England and Scotland, to study the effects of changes in tuition on university applications and participation rates. The

show that, for the group not eligible for means-tested cash grants, a change in fees of £1,000 corresponds to a drop in enrollment by around 0.025 percentage points. For those eligible for grants, there is an offsetting effect, such that the compound effect is not statistically significant, or is small but positive.

In a related study, Murphy, Scott-Clayton and Wyness (2019) descriptively investigate the English higher education system as a whole and, using data from the British Labour Force Survey over the main reform period (1992 to 2016), they plot the annual enrollment rates over the period. They show that the introduction of the fee-paying system suggested rising enrollment and a narrowing of the participation gap between advantaged and disadvantaged students. Our paper extends this analysis in several ways. First, we uses rich individual-level longitudinal data for around 93 percent of all English student that links schooling information to university and labor market data. By matching students within neighborhood and school, as well as including relevant controls, we can causally estimate the effect of the reforms on enrollment, as well as several other outcomes. Second, we complement our analysis with a differences-in-differences analysis, using Scotland as a control group. This analysis also combines a long pre-treatment period to test for pre-treatment trends. Third, we implement a weighted estimation strategy that allows us to disentangle the impact of the two major components of the reform: increased tuition-fees and increased means-tested maintenance (cash) grants. Fourth, we offer a comprehensive analysis of several outcomes beyond university enrollment, both at university and at an early-stage of the labor market.

Our paper also relates to a literature that studies the effects of changes in fees on other university related outcomes. For instance, Garibaldi, Giavazzi and Rettore (2012) show that an increase by €1,000 in fees decreased probability of late graduation by 5.2 percentage points in Italy. Angrist, Lang and Oreopoulos (2009) show that financial incentives to improve academic performance had a modest effect in Canada. Denning, Marx and Turner (2019) show that grant aid targeting disadvantaged college students in Texas public colleges generates significant increases in degree completion, as well as earnings gains later on in life. Furthermore, Deming and Walters (2017) study the effect of state funding changes in the US and find large positive effects of state funding on both enrollment and degree completion. Several studies have highlighted the importance of distance on university enrollment (Card (1995)) and university choice (Long (2004); Gibbons and Vignoles (2012)).[4] Moreover, there is a growing empirical and theoretical literature that aims to understand the optimal way to finance higher education (see, for instance, Lincoln and Walker (1993); Salmil (2003); Jacobs and van Wijnbergen (2007); Del Rey (2012)) and the best policy designs to overcome

study shows that an increase in tuition fees decreased the number of university applications, especially for courses with higher earning potential. Enrollment rates also drop, falling more in local authorities with higher rates of participation in higher education and for white students.

[4]Card (1995) proposes that distance was an important determinant of college participation in the US. Gibbons and Vignoles (2012) find that geographical distance had a significant effect on university choice in England, although it did not affect the decision to enroll.

college entry barriers (see Page and Scott-Clayton (2016)). The idea is that a well-designed system could, potentially, be both efficient and equitable. Our paper also contributes to the literature which focuses on the relationship between price discrimination and opportunities in higher education for low-income students. Andrews and Stange (2019) show that differential university fees in public universities benefit low-income students who are more likely to select into higher-earning degrees. Their findings are explained by the fact that the fees deregulation in early 2000s in Texas was followed by higher fees for top paying degrees and by increases in need-based grant aids in such a way that the costs for the low-income were lower.

Finally, there is a considerable behavioral literature that suggests that individuals may make suboptimal investment decisions in higher education by mispredicting the costs of higher education (Horn, Chen and Chapman (2003); Usher (2005)). Students may also either be unaware of the available financial aid (Chan and Cochrane (2008)) or misjudge their eligibility for financial help (Zarate and Pachon (2006)). There is also evidence that these mispredictions are more prevalent among low-income students (Grodsky and Jones (2007)). Moreover, there is evidence that students' debt level affects their career choices (Field (2009); Rothestein and Rouse (2011)).

By focusing on a wide series of outcomes, our study offers a comprehensive analysis of several dimensions of higher education reforms in England. Our paper contributes to the growing literature on higher education financing by providing insight into the impact of the reforms on enrollment, as well as a variety of other outcomes, including geographical mobility, university choice, choice of field of study, the completion rates, and (early) labor market outcomes. Using detailed longitudinal data, we follow students from school to university and study the enrollment impacts of reforms, which involved both higher tuition fees and improved access to more financial support for students from lower economic backgrounds.

The rest of the paper is structured as follows. Section 2 describes the institutional framework, focusing on the recent higher education reforms implemented in England and the English education system. Section 3 presents the data used in the analysis, while section 4 details the empirical strategy used. Sections 5 reports the results and section 6 concludes.

2 Institutional Framework

In this section, we describe the higher education reforms that took place in England. To help understand the context, we then briefly describe the education system and the process to enter college.

2.1 Higher Education Reforms

Until 1998, students studying for an undergraduate degree – typically three-year programs – could attend university free of charge. Starting in the academic year 1998, the government

introduced a package reform that included the introduction of tuition fees. Students were obliged to pay a maximum of £1,000 per year, at the beginning of each academic year. However, the amount paid was means-tested, such that the amount paid by each student depended on their family income. In particular, students were exempt from paying fees if the family income was less than £23,000 per year. For students from households with a family income between £23,001 and £35,000, a reduced amount was paid, while those whose families earned more than £35,001 were charged the full fee.

The Higher Education Act 2004, effective from 2006, changed the tuition regime again with three major changes: first, all students – irrespective of household income – were obliged to pay tuition fees; second, universities were given discretion over the level of tuition fees charged; third, the maximum amount of tuition fee trebled to £3,000 per year (inflation-indexed).[5] Most universities charged the maximum fee permitted of £3,000. In 2010, further reforms were announced. With respect to tuition fees, the most important change being that fees would increase to a maximum of £9,000 per year from 2012.[6]

Since 2006, tuition fees have not been longer means-tested; however, the reforms introduced several systems of support to less financially advantaged students to pay for tuition fees. The most prominent was that all students were eligible to apply for tuition fee loans from a government-backed student loan company, independent of their economic situation. These loans would cover the entire cost of tuition fees and were payable, in installments, after graduation and once their income level exceeded a certain amount. In 2006, this was set at £15,000, and the income threshold for repayments increased to £21,000 in 2012. The loans were repayable with some interest, but these were very small – 1.25 percent in 2006 and in 2012 – and the interest rate was set at the maximum of RPI plus 3 percent for graduates earning more than £41,000.[7]

In conjunction with the tuition-fee loan system, the reforms introduced means-tested related support. Means-tested maintenance grants, which stood at around a maximum of £949 in 1998, were then increased substantially to a maximum of £2,700 in 2006 and £3,250 in 2012. Means-tested loans were also available. These offered a zero-real-interest-rate loan of up to £2,400 in 1998, which increased to a maximum of around £4,000 in 2006, and then to £5,200 in 2012. Maintenance loans increased for all students throughout the reforms, although they were relatively smaller for students who benefited from maintenance grants.

Table 1 summarizes all the fees and the financial support available to students based on their family income level under each of the three fee regimes. We present figures for the first year in which tuition fees were introduced (1998), the first year in which the maintenance grants that were scrapped in 1999 were reintroduced (2004), the first year in which the tuition fees increased to £3,000 (2006) and the first year with the tuition fees trebled to £9,000

[5]Devolution meant that Scotland, Northern Ireland and Wales pursued different policies.

[6]In 2017, university tuition fees in England rose to £9,250, per year.

[7]In 2006, students would pay 9 percent of the value of the annual income in excess of £15,000. In 2012, students would still pay 9 percent of the value of their annual income, which was in excess of £21,000, but for students earning less than £41,000 the interest rate was smaller, equal to the RPI.

(2012). Table 2 provides more clarity on the total upfront costs (calculated as the value of the tuition fees minus the maximum maintenance grants available) and the maximum financial support available (calculated as the sum of the tuition fee loans, the maximum maintenance grant and the maximum maintenance loan) for each group. The table highlights that, despite the considerable increase in upfront costs across parental income groups, there has also been a significant increase in the available financial support for all groups. For instance, until the 2012 reform, for students from low income households (under £20,000), upfront costs are changing very little, while financial support is expanding. Note that, the value of the maintenance grants – which is not repaid after graduation – reduces the amount of maintenance loan (i.e., repayable support) for which they are entitled. Lower income students will, therefore, have a lower financial burden to repay after finishing their studies, relative to students from higher income families.

2.2 English Education System

Full-time education in England is compulsory for all children aged between 5 and 16 years old. The public education system – which covers approximately 93 percent of children – is organized into five Key Stages (KSs). KSs set the educational knowledge expected of students at various ages. Evaluations begin with KS 1, when students are aged approximately 7 years old, and marking the end of compulsory education, KS 4 is taken when students are approximately 16 years old. KS 4, the most important evaluation, is the national-level examination also known under the name General Certificate of Secondary Education (GCSE). Most students take exams in around ten different subjects. While GCSE English and Maths are compulsory, students can choose from a selection of other subjects and choose the total number of GCSEs.

At the end of compulsory education, students decide to either end their formal education or continue their studies for two more years, choosing between a vocational or an academic track. For students aspiring to go to university, the most common path is to take the final KS - KS 5 - in three or four subjects. These are national-level exams, known as the General Certificate of Education Advanced Level (A-levels). The choice of subjects tends to be closely related to the students' university degree preferences, and university admissions are largely determined by the test scores obtained in the A-levels.[8]

When applying to a British university, students choose specific fields of study, and their degrees can vary in length based on the location and the subjects studied, with most lasting three years in England.[9] In our study, we focus only on English universities, as

[8]Some universities, such as Cambridge or Oxford, also ask prospective students to attend an interview as part of the admission process.

[9]The application process is centralized, and each student applies through the Universities and Colleges Admissions Service to up to five university/field-of-study groups. Applications are analyzed separately by each institution department, and offers are made conditional on the grades obtained at the A-level exam, which is taken after the university admission process is ended. Students need to choose their top two preferences from the offers received before sitting for the A-level, and if they meet the grade requirements,

most English students – approximately 95 percent – enroll in an English university (HESA (2006)).

3 Data and Descriptive Statistics

In this section, we first describe the main data sources used in the analysis. We then present some summary statistics and describe the main outcome variables.

We use individual-level data linking information from three main data sets: The National Pupil Database (NPD), the Higher Education Statistical Agency (HESA) and the Destination of Higher Education Leavers (DLHE). The data cover students who enrolled in college between 2004 and 2013, allowing us to follow cohorts of students affected by the 2006 and 2012 higher education reforms. Approximately 500,000 students completed compulsory school in an English state school each year between 2002 and 2011.

The NPD is provided by the English Department for Education and comprises an administrative data set of all students enrolled in state schools in England – this represents approximately 93 percent of all English pupils, the remaining being enrolled in independent schools. We focus on students enrolled in secondary education and use mainly information contained in the Pupil Level Annual School Census (PLASC), which is one of the many data sets included in the NPD. In particular, we use detailed information on the geographical residence of pupils (we have information at the lower-layer super-output-area level, totaling approximately 32,400 areas), variables related to demographic characteristics (for instance, gender and ethnic origins), and students' grades obtained on the GCSE.[10] Although the data do not include information on parents' income, the NPD dataset includes information on students' social economic status. In particular, it includes a measure of socio-economic status - the Income Domain Affecting Children Index (IDACI), and a measure indicating whether each pupil was getting free school meals (FSM) at age 16. The IDACI indicator is a continuous variable between 0 and 1 that measures the percentage of children aged 0 to 15 years old living in income-deprived families in a lower-layer super-output area.[11] For each cohort of pupils finishing their compulsory school, we group pupils into three socio-economic categories using the terciles of the IDACI score (when in secondary school).

We link the NPD data to the HESA data. The latter contains information about the university and field of study pursued by English students graduating from a state secondary

they can enroll. Students who do not meet the thresholds imposed by either of their two options may still find a free spot at a university that did not fill in all their positions by going into clearing.

[10]The lower-layer super-output area covers areas with a minimum of 1,000 (400) and a maximum of 3,000 (1,200) individuals (households). There are in total 32,482 lower-layer super-output areas in England in the period we consider.

[11]It should be noted that a household is considered income-deprived if the household income (before housing costs and without housing benefits) is below 60% of the national median income and if they are receiving any form of income support or benefits. Source: Association of Public Health Observatories, 2012 Deprivation scores. Website: `http://www.makingthelink.net/data-source/deprivation-scores`

school. In total, there are 117 universities.[12] We have detailed information on fields of study, which we classify into five groups: Medicine, Dentistry and Allied Subjects; STEM; Social Sciences; Languages and History; and Arts, Education, and Other. To rank universities, we use the Guardian League Table. This is a well-established, annually published league table ranking almost all (approximately 120) British universities between 2004 and 2009.[13] Based on this league table, we construct a measure of university ranking. To ease the interpretation of the results, we flip the ranking, so that a higher number means a better university. We then normalize the newly created ranking by academic year. The HESA data includes information about students' behavior during university, such as length of degree completion, whether they dropout from university, and whether they switch programs.

We further link the NPD and HESA data to the DLHE data. The DLHE is a survey collecting individual-level information on leavers of higher education six months after graduation. The available data allows us to track most of the students who finished their undergraduate degrees between 2006 and 2011. It collects data on the personal characteristics of leavers, the details of their current employment - such as employment status, type of contract, and earnings - and the further studies they pursued after finalizing their undergraduate studies. The response rate among UK-dwelling students is reasonably high (approximately 80 percent).[14]

This linked data set allows us to follow all students in English state schools from secondary education to post-compulsory education and, in many cases, the labor market. Our analysis is mostly based on information on 6 cohorts of English students who started their undergraduate degrees between 2004 and 2009. We extend this to the later 4 cohorts, until 2013, to look at the 2012 reform.

We complement our analysis using aggregate data that allows us to conduct a differences-in-differences analysis, comparing Scotland and England before and after the major reforms. Unlike England, Scotland does not charge students tuition fees and, as we describe in more detail in the next section, serves as a suitable control group over the same period of time.[15] We use two main data sources. The first, the Universities and Colleges Admissions Service (UCAS) data, comprises of information on the number of accepted undergraduate offers in English and Scottish universities between 2004/05-2009/10. The information is at the

[12]To control for changes in the supply of places due to university mergers, openings or closures, a balanced panel of universities that reported a positive number of enrolled students at undergraduate level over the period 2004/05-2009/10 is considered, totaling 117 universities.

[13]A comprehensive set of criteria is used in the construction of the ranking, including measures of the expenditure per student, staff-student ratio, job prospects, value added, entry tariff, course satisfaction, teaching quality, and feedback.

[14]According to the HESA data, the response rate for those graduating from full-time courses with a first undergraduate degree was 81.8% (in 2004/05), 80.1% (in 2005/06 and 2006/07), 79.9% (2007/08), 82.7%(2008/09), 83% (in 2009/10, 2010/11) and 82.3% (in 2011/12). Although HESA tracks only students with jobs in the UK, we focus only on students living in the UK, so the overall response rate are good indicators of a high response rate for our analysis.

[15]Scottish domiciled students who pursue undergraduate degrees in Scottish universities are not charged fees. The endowment scheme of 2001, which required Scottish domiciled students to pay a *total* of £2,000 after graduation if their annual income was in excess of £10,000, was abolished in 2007.

domicile level (Scotland and England) and by university (128 institutions), gender, age, and socio-economic status.[16] The second data source, the HESA aggregated data, includes information on total number of first year full-time undergraduate in England and Scotland. This HESA dataset is less detailed – aggregated at university, domicile and year level – but offers a longer pre-reform data series (starting in 2000/01).

3.1 Descriptive Statistics

In Table 3, we present the main characteristics of the students in the sample before and after the 2006 reform. The first three columns refer to the period before the reform (i.e., the academic years 2004 and 2005) and the first four years under the new fee regime (i.e., the academic years 2006 to 2009). Panel A presents the demographic characteristics and the academic performance of students at the exams taken at the end of compulsory education, the GCSEs. On average, approximately 450,000 students sit for the GCSEs in an academic year. Overall, these characteristics are relatively unchanged before versus after the reform. Comparing the ratio of female students before and after the reform, it seems that there has not been a significant change in the gender composition, with approximately 49 percent of the students being females. Moreover, approximately 85 percent of students are White, with a constant share both before and after the change in tuition fees. Approximately 14-15 percent of students had free school meals at age 16, both before and after the 2006 reform. Students sat for GCSEs in 8 subjects on average. On average, there are no considerable differences in the academic performance at GCESs before versus after the 2006 reform.[17]

Panel B presents the main outcome variables in our analysis. In the regression analysis, we will quantify, more specifically, the changes from before to after each reform. Here, however, we will define the variables and explain how each is measured. The first outcome variable is the enrollment probability, which is defined as a categorical variable equal to 1 if a student is enrolled at age 18 as a first-year undergraduate in an English university and 0 otherwise. We see that approximately 24 percent of students from state schools enroll in university – this seems unchanged before and after the reform. The UK Department for Education official statistics show that the percentage of pupils in state-funded schools who entered higher education by age 19 ranged between 30% and 37% for the period 2005/06-2013/14.[18] In our paper, since we focus only on students who enrolled without taking a gap year and pursuing an undergraduate degree in an English university, the percentage is lower.[19]

[16]This classification is based on the occupation (or the most recent occupation if retired or unemployed) of the highest-earning family member of the household that the student lives with.

[17]Table C.1. in Appendix C provides details of how the marks are calculated.

[18]The data refer to UK higher education institutions and English Further Education Colleges. Source: `https://www.gov.uk/government/statistics/widening-participation-in-higher-education-2016`

[19]The enrollment rate in all British universities of 15-year-olds from state-funded English schools who entered an undergraduate degree by age 19 varies between 33% and 36% in our data.

We next present the outcomes used to measure the geographical mobility of students, focusing only on those who pursue an undergraduate degree in an English university. Our main outcome variable is the geographical distance, which is measured as the log kilometer distance between a student's home address at age 16 and the university attended. To calculate this distance, we use the coordinates of the centroid of the lower-layer super-output area, which is the most disaggregated geographical location we have access to, and the geographical coordinates of the university's postcode. We look at an alternative geographical measure: whether the student is enrolled in a university located within the same commuting area as their home. We define the commuting area as the travel-to-work area, which is denoted by the Office for National Statistics as a collection of wards for which at least 75 percent of the economically active residents actually work in the area and for which at least 75 percent of those that work in the area actually reside in the area. On average, students who enroll before the change in tuition fees attend universities that are located at a similar distance from home when compared with those who enroll after the reform, travelling approximately 47 km. Approximately 21 percent of students are enrolled in the same commuting area as their home, independent of the time when they enrolled.

When considering the quality of the university attended, only 22-23 percent are pursuing a degree in one of the 16 leading English universities that formed the Russell Group at the time of our analysis.[20]

Our data contain 20 fields of study, but to increase the precision of our estimation, we group them in 5 wider groups: Medicine, STEM, Social Sciences, Languages, and Arts and Education. We see that approximately 30 percent enroll in Social Sciences, followed by those in Medicine, Dentistry and Allied subjects and STEM degrees, with shares of approximately 22-24 percent and 20 percent, respectively (see Table C.2. in Appendix C for a detailed description of the grouping of subjects).

Using the DHLE survey, we also analyze the longer-run effects of the 2006 reform. We focus on current status measured six months after graduating university: employed, unemployed, and further studies. Conditional on being employed, we look at the type of contract: permanent versus temporary, as well as their earnings – ln (annual earnings). We find that approximately 63 percent students are employed, approximately 7-8 percent are unemployed and 23-24 percent are pursuing further studies, independent of the fee regime under which they study. Moreover, among those employed, 64 percent are on a permanent

[20]The Russell Group was formed in 1994 by 17 British research universities: University of Birmingham, University of Bristol, University of Cambridge, University of Edinburgh, University of Glasgow, Imperial College London, University of Leeds, University of Liverpool, London School of Economics and Political Science, University of Manchester, Newcastle University, University of Nottingham, University of Oxford, University of Sheffield, University of Southampton, University College London and University of Warwick. Cardiff University and King's College London became part of the group in 1998. Queen's University Belfast also joined the group in 2006. Since 2012, the group has extended to include 24 universities, with the addition of Durham University, University of Exeter, Queen Mary University of London and University of York. Thus, in our paper we refer to the Russell Group as all 16 English universities that formed the group before 2011/12.

contract, and 86 percent work full-time, earning around £15,000 annually before the reform. After the reform, only 80 percent work full-time, and those who work earn just under £14,000 on average.[21]

4 Empirical Strategy

In this section, we first present the main specifications, based on the individual level English data – the baseline specification and the heterogeneity analysis. We then proceed to describe the differences-in-differences analysis, which uses more aggregate data on England and Scotland.

4.1 Baseline Specification

We estimate the effect of the higher education reforms on a comprehensive set of outcomes. Using a detailed set of controls, we match cohorts of students who enroll in university in the academic year that they turn 18 years old before each reform, with cohorts of students who enroll in university in the academic year that they turn 18 years old after each reform. In particular, as well as individual-level controls, we include detailed school and geographical fixed effects to ensure we compare highly similar students before and after the reform. In our sample, there are approximately 4,300 schools and approximately 32,500 local neighborhoods, such that, even within a school, we compare at a more localized level.

We estimate the following regression:

$$y_{islt} = \alpha + \beta T_t + X_i^{'}\gamma + \theta ln(CS_t) + f(t) + \eta_l + \sigma_s + \epsilon_{islt} \quad (1)$$

where y_{islt} is the outcome variable (for instance, the probability to enroll in higher education, (log) geographical distance between home and university, university choice, field of study choice, length to completion of program, dropout rate, labor market outcomes) for student i, from school s, living in neighborhood l, in year t. T_t is a categorical variable that takes value 1 if enrolled as a first-year student in the post-reform period and 0 otherwise. X_i represents a vector of individual characteristics (including gender, ethnicity, socio-economic index, number of GCSE exams, and grades in the GCSE exams); $ln(CS_t)$ controls for changes in the cohort size and $f(t)$ is a flexible time trend. We also include detailed fixed effects at the local-neighborhood level (η_l), as well as at the school level (σ_s). We cluster standard errors at the school level.

The impacts of the reforms are identified by closely matching students from different cohorts before and after the reforms. For instance, since we can identify students at the school level, we can match them within each school, as well as within the same neighborhood. We conduct several robustness checks, which are discussed in detail later in the paper. In

[21] Earnings are expressed in 2001 pounds.

particular, we look at tighter time bands before and after the reform. For socio-economic categorization (described below), we use several socio-economic groups rather than just three, as well as the more traditional measure of free school meal eligibility as an alternative measure.

4.2 Heterogeneity Analysis

To estimate the differential effect of the reforms on different socio-economic groups, we use the following equation:

$$y_{islgt} = \lambda_g T_{gt} + \omega_g + X_i^{'}\gamma + \theta ln(CS_t) + f(t) + \eta_l + \sigma_s + \epsilon_{islgt} \tag{2}$$

where T_{gt} takes value 1 if the student is treated and belongs to group g - the terciles of the IDACI score when the student is in high school, where the baseline group is the top tercile. ω_g captures the group fixed effects. These g groups correspond well to the income distribution across neighborhoods in England. Those in the lowest socio-economic index category correspond to an average household income of less than or equal to £29,000; those in the middle socio-economic index category correspond to an average household income of around £34,000; and those in the high socio-economic index correspond to an average household income of around £43,000 or above. In our analysis, the baseline category will be the high-socio-economic-index group.[22]

To understand the differential impact of the *different components* of the reform – the tuition fees, the means-tested grants, and the means-tested loans – we also apply a weighted estimation procedure, constructed using local-level income data. Between 1998 and 2006, the financing form, as well as each component, differed across students depending on their household income. For example, students with household income above £40,000 saw an increase in tuition fees by around £1,800 and very little other major change. Students in a households with parental income below £10,000, saw a tuition increase from zero to £3,000, but this was coupled with a grant that increased to £2,700 from around £900. Although we do not observe students' household incomes to directly use these income thresholds to estimate the relative importance of each component, we use very local, neighborhood-level, income data to compute, for each student, the probabilities of being eligible for a full maintenance grant, for a partial maintenance grant and for no maintenance grant.[23] To define the three groups, we use the exact thresholds given by the Student Loan Company (see Table B.1. in Appendix B for exact details). Using these data, we then weight estimation (1)

[22]Calculated using Office for National Statistics data on model-based estimates of weekly household income level at the middle output-area level in 2007.

[23]The Office for National Statistics provides household annual income level data at the middle super-output-area level in 2015. Available at: `https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/earningsandworkinghours/datasets/smallareaincomeestimatesformiddlelayersuperoutputareasenglandandwales`

based on these probabilities, to understand the importance of each component on students' outcomes.[24]

4.3 Complementary Analysis: Differences-in-Differences

To further investigate the impact of the reforms on participation and separate the effect from potential time effects, we complement our main analysis using a differences-in-differences analysis that compares, before and after the funding reforms, English domiciled students – who pay tuition fees for undergraduate degrees pursued either in Scotland or England – with Scottish domiciled students – who do not pay tuition fees for undergraduate degrees pursued in Scotland. To estimate the effect of the reforms on participation, we use two data sources: HESA and UCAS. The HESA dataset is disaggregated only at the university level but provides a longer pre-reform time series (covers the period 2000/01-2009/10), while the UCAS dataset is more detailed and breaks-down the aggregate number of accepted places by university, as well as age, gender and socio-economic group (covers the period 2004/05-2009/10).

We estimate the following equation:

$$y_{idt} = \beta_0 + \beta_1 D_d + \beta_2 D_d * After_t + X_i^{'}\gamma + \sigma_t + \mu_{idt} \tag{3}$$

where y_{idt} represents the inverse hyperbolic sine transformation of the number of accepted places in each university, age, gender, socio-economic group, from domicile (Scotland or England) d, at academic year t.[25] D_d is equal to 1 if the group i is represented by English domiciled students and it is 0 if it refers to Scottish domiciled students. X_i is a vector of variables, including age and gender identifiers. σ_t captures the time (year) fixed effects. The analysis is extended to study the heterogenous effects (as with the individual-level linked data) by socio-economic status.

The key identifying assumption is that trends in the dependent variable would have been the same for English and Scottish students in the absence of the policy changes. We test for the validity of this assumption in several ways. First, Figure 3, which presents the total enrollment of undergraduate students, shows that the share of Scottish students who attend English universities remained stable over time – not changing from 94% studying in Scotland over the period before and after the reform. Similarly, the share of English students who pursue undergraduate degrees in English universities also remained stable at around 95%. It seems, therefore, unlikely that the flow of Scottish students pursuing degrees outside Scotland were affected by the reform.

[24] We adjust the income data using the CPI for each year in our sample and adjust for any income thresholds changes for maintenance grant eligibility.

[25] We have used the inverse hyperbolic sine transformation to account for the fact that some university-age-gender-socio-economic group - domicile cells have no students.

Second, we perform an event study. In particular, we re-estimate equation (3), using a series of treatment and time dummies interactions. The results presented in Figure 4, which plots the estimates for the interaction from 2000 to 2009, reassuringly, show that there is stability around zero in the placebo treatment effect in the pre-period. This suggests that the evolution of the enrollment rates is comparable across the two groups of students before the 2006 HE funding reform.

5 Results

In this section, we present the main results. We begin by investigating the impact of the reform on enrollment among all students, as well as differentially by socio-economic group. We then analyze the impact on other margins among those who enroll. It is important to understand if the reform impacted other dimensions of higher education choices. Students might alter their choices relating to higher education, which might then have an impact on outcomes because of their implications related to sorting - both in higher education but also in the labor market. In particular, their choice of institution, its location, and program of study, as well as behavior when in college - such as dropout, year-repetition, and program switching. Finally, we link the impact of the reform to later outcomes in the labor market, including their employment status, type of contract and earnings.

5.1 University Enrollment

Table 4 presents the results that estimate equation (1) - the effect of the change in the higher education funding in England on enrollment rates. The baseline estimate (Column [1]), without any controls, shows that the 2006 reform increased the enrollment rates by 0.4 percentage points. However, once we control for time trends (in Column [2]), we see that the overall effect, while still small, is negative (1 percentage point). The inclusion of cohort size (Column [3]) does not change the magnitude of the effect.[26] Similarly, controlling for neighborhood fixed effects (Columns [4]) has little impact. In Columns [5] and [6], we control for individual characteristics. We see that females and top-performing students are more likely to enroll in university, while White students and those from lower-income backgrounds are less likely to pursue an undergraduate degree (in line with the findings of Crawford and Greaves (2015)). However, the inclusion of these characteristics has only a small effect on enrollment following the reform – a drop of 0.5 percentage points. When including school fixed effects (Column [7], which allows us to compare different cohorts of students from the same school, we find little additional impact. Finally, we cluster the standard errors at both the lower-layer super-output-area level and the school level (Column [8]), showing similar

[26]In Table A.1., we provide robustness checks on the time trend and cohort size, showing polynomials of different orders. The analysis highlights that it is the inclusion of a simple trend that is the main driver of the change in the baseline estimate.

effects of the reform on enrollment. Overall, after the inclusion of extensive controls, the estimates suggest that the 2006 reform reduced enrollment by only 0.5 percentage points.

In Table 5, we re-estimate equation (1) separately by socio-economic groups. Interestingly, although the overall effect continues to be very small, the heterogeneity of the effect goes in the direction of having a stronger negative effect on the higher socio-economic group than the middle or lower. The estimated effect is around a 0.9 percentage point fall in enrollment among the highest group (Column [2]), a drop that is not statistically significant for the middle group (Column [4]) and a coefficient that is close to zero and significant only at the 10-percent level for the lowest income group (Column [6]). This is likely to reflect that, while tuition fees increase the costs associated with attending university, the means-tested grants and loans protect those from the lower socio-economic groups. In particular, the provision of support seems to have offset the effect of tuition fees on university participation. However, it is again important to emphasize that, overall, the effects are small - even along the socio-economic distribution.

To better understand the change in the enrollment gap across socio-economic groups, in Table 6 we estimate equation (2), which interacts the socio-economic index with the 2006 regime change (Columns [1] to [3]). Column [4] shows that the results are robust to the inclusion of time dummies rather than the time trends and the cohort size measure. In other words, the results are not driven by other simulatenous factors that are cohort specific. The analysis indicates that, relative to the highest socio-economic group, the impact of the reform has been weaker on the lower socio-economic group (as shown in Table 5). This finding suggests that the 2006 higher education funding reform reduced the gap in enrollment across socio-economic groups.

We conduct some additional checks on the main result. First, in Table A.2., we expand the number of socio-economic categories to five and find that the monotonicity in enrollment effect continues to hold even when looking more narrowly along the socio-economic distribution. Second, in Table A.3., to investigate whether the results are robust to the 2008 financial crisis, we restrict the analysis to a narrow window just before and after the 2006 reform (i.e., comparing cohorts enrolling in 2005 and 2006). These cohorts are important for this analysis because, while students in these cohorts are enrolled in university before the crisis, only the latter cohort is affected by the reform. We find that our main findings hold. Third, in Table A.4., we use eligibility to free school meals as an alternative measure of the socio-economic status. We find that those eligible for a free school meal at age 16 have a higher predicted probability to enroll in an English university after the 2006 reform. Fourth, in Table A.5., we restrict the analyse to universities outside London. Since London universities comprise of a cluster of highly ranked universities, we check whether the results are mainly triggered by the London-based universities. The results are reported in Columns [1] - [3]. It seems that restricting the sample to universities not located in London does not change the results.

To better understand the relative importance of each component of the reform, in Table 7, we show the regressions that are weighted by the likelihood to be in different income categories. Column [1] presents the results of a weighted regression by the predicted probability that a student is not eligible for a maintenance grant, in Column [2] the regression is weighted by the predicted probability that a student is eligible for a partial maintenance grant, and in Column [3] the regression is weighted by the predicted probability that a student is eligible for a full maintenance grant. The results suggest that there are heterogeneous effects, with an increase in enrollment among those eligible for full maintenance grants who are in the bottom of the income distribution. Among those not eligible for a maintenance grant, they face only an increase in the tuition fees under the 2006 reform. Among this group, we see a small fall in enrollment by 0.5 percentage points.

Finally, Table 8 presents the results from the differences-in-differences estimation strategy that compares English domiciled students with Scottish domiciled students, allowing us to better control for potential time effects. Overall, our results correspond well to the individual level analysis, which focuses only on the English system. Using both, HESA data and UCAS data (Columns [1] and [2]) we show that, overall, there is no significant impact on university participation for English students, following the 2006 higher education reforms. In Columns [3] to [5], looking separately at high, medium and low socio-economic groups, we also do not find a significant impact. However, similar to the individual-level analysis, the point estimate suggests a more negative impact on the higher socio-economic groups than the lower socio-economic group (although not statistically significant).

Overall, we find that the introduction of tuition fees of up to £3,000 per year for all students, combined with increased means-tested grants and loans, had a very small impact on university enrollment. Moreover, much of this reduction is borne on those from a higher socio-economic background. One potential explanation for these heterogeneous effects could be that, although the new funding schemes increased the tuition fees considerably, the financing constraints associated with higher education for those from lower socio-economic backgrounds were reduced. In particular, students were given access to means-tested grants of up to £2,700 per year and loans of around £4,000 per year. Moreover, the non-upfront payment of tuition fees might also, in part, explain the small magnitudes.

5.2 Geographical Mobility

Although the 2006 reform seems to have had only a small effect on enrollment, it is important to understand the impact on other dimensions. We start by looking at the impact on study-location choice. First, we focus on the geographical distance between a student's home and the university enrolled in. Second, we estimate the effects on the probability of studying in a university located within the same commuting area.

Table 9 presents the effects of the changes in the funding of higher education on various measures of geographical mobility. Columns [1] to [3] present the effects on the linear

geographical distance between a student's home (as reported at age 16) and the university enrolled in (expressed in kilometers). Our estimates indicate that the distance to university fell by approximately 2.6 percentage points. However, there exists a differential effect when we look across socio-economic groups (Columns [2] and [3]). In particular, while those from a higher socio-economic background are less likely to enroll in a university located further away from home after the reform, the students from less wealthy households are more likely to pursue a degree in a university located further away from home, with a higher magnitude for those in the bottom of the income distribution. That is, the socio-economic gap in geographical mobility seems to be closing.

To understand better the effects of the reforms on students' geographical mobility, we further consider the effects of the new reforms on the likelihood of studying in a university located in the same commuting area. Columns [4] to [6] show that the changes in the funding reforms increase a student's probability of pursuing a degree in a university located in the same commuting area as a student's home by 0.8 percentage points, with stark differences in the areas where students are located depending on economic background. In particular, after the reform, students in the top part of the distribution are more likely to study within the same commuting area than before, while those from the bottom of the distribution are more likely to study in a university located outside of their home's commuting area. These findings are in line with the ones reported above, showing that students are more likely to respond to the changes in the funding of higher education by enrolling into universities closer to home.

Overall, this section provides suggestive evidence of a fall in the socio-economic gap associated with geographic mobility as a result of the 2006 reform. In Table A.5., we exclude universities located in the capital from our main analysis, since London is a wealthy area and the city with many more universities than any other. Overall, we find that the effects do not seem to be driven by London (Columns [4] to [9]), except for the probability to study in a university located within the same commuting area. In particular, Columns [7] to [9] show that students from the lower income group are not less likely to pursue a degree in a university farther away from their home after the reform, if we exclude the institutions located in London.

5.3 University and Program Choice

In this section, we investigate how the 2006 higher education reform affected the type of university and field of study pursued by students, as well as how it influenced students' behavior within university.

5.3.1 University Quality

Using the standardized Guardian League ranking of the university (described in detail in Section 3), we investigate the change in the likelihood of attending a better-ranked university

as a result of the reform change. Column [1] of Table 10 shows that the 2006 reform had a small, not statistically significant, positive effect on attending a better-ranked university. Yet, there was a small decrease in attendance at higher-ranked universities among those in the lowest socio-economic background (Column [3]). Moreover, the probability of attending a Russell Group university does not differ by socio-economic group (column [6]). Overall, the magnitudes and economic significance are small. Finally, we look at the probability of pursuing a degree in a university located in London, where many high-ranked universities are located. The results reported in columns [7] to [9] show that, on average, it is students from higher socio-economic backgrounds that are more likely to pursue degrees in universities based in London. For the low-income students, the reform decreases their likelihood of studying in London by 1.6 percentage points (Column [9]). When we restrict the sample only to those students who did not live in London, there are no effects for the low- and medium-income students (Column [10]).

5.3.2 Field of Study

We next analyze how the choice of field of study is affected by the 2006 reform. We compute the wage by field of study using the UK Labour Force Survey (2001). This allows us to check whether the reform influenced the field of study selection based on perceptions of future returns. Table 11 presents the results. Overall, we find no effect of selecting a field of study with an above- versus below-median return after the 2006 reform (Column [1]). However, by socio-economic group, there are some differences. In particular, the higher socio-economic group is likely to select a higher-paying field of study relative to the middle and lower groups.

In Table A.6. we complement this analysis by reporting the effects of the 2006 reform on field of study choice. The outcome variable of interest is the probability of pursuing one of the main five fields of study defined in Section 3 - medicine, STEM, social sciences, languages and arts. Anticipating that tuition fees must later be repaid, students might be inclined to select programs that are associated with higher labor market payoffs or that are more vocational. Overall, we find small effects. It seems that the 2006 had no overall impact on enrollment in Medicine (Column [1]), STEM programs (Column [3]), Language-related programs (Column [7]) or Social Sciences (Column [5]), but it reduced enrollment in the Arts (Column [9]). Focusing on the gaps across socio-economic groups, we find quite mixed results. Our findings suggest that, relative to higher socio-economic groups, the 2006 higher education reform increased the probability that students from lower socio-economic backgrounds would pursue Medicine-related degrees by around one percentage point (Column [2]). However, the reform reduced the probability that this group would pursue a STEM degree by a similar amount (Column [4]). Relative to other groups, after the reform, the middle socio-economic group is less likely to enroll in a Social Science program (Column [6]). The middle and lower socio-economic groups are more likely to

enroll in Languages (Column [8]). Finally, the highest socio-economic group is less likely to enroll in Arts and Education programs (Column [10]). These findings are in line with the ones reported in Table 11, as STEM degrees tend to pay higher wages. Regarding the Medicine-related degrees, given that this definition is quite broad, not all expected wages are higher, so the results are still in line with the ones from Table 11.

5.3.3 Performance during College

We now turn to student behavior in the institution enrolled and, in particular, the likelihood of completing the degree program, the time taken to complete it and whether students switch programs. The results are reported in Table 12. Column [1] shows the effects of the 2006 reform on the number of years to complete a degree, including only those who graduated from a university. Overall, it seems that students take more time to finish their degree after the reform. Across the income distribution (Columns [2] and [3]), the gap in completion narrows after the reform, since for the lowest socio-economic group the length of degree is shorter relative to the highest socio-economic group. Column [4] also includes field of study fixed effects, and the results are very similar to the ones reported in column [3]. To account for the different degree length by field of study, we look separately at each degree. The results shown in columns [5] to [9] indicate that the largest decreases are among Medicine-related degrees, Social Science degrees and STEM degrees, which are often linked to studies beyond the undergraduate degree - such as going to medical school or law school. This might suggest that students from lower socio-economic groups are less inclined to specialize with the required certification in potentially high-paying fields of study.

Columns [10] to [12] show that there are no differential effects across the income groups after the 2006 reform was implemented regarding the likelihood of changing degrees. Moreover, although the average dropout rate is not affected by the reform, high-income students are more likely to drop out, while middle-income students are less likely to drop out (Column [15]). Again, the magnitudes are small.

To sum up, it seems that once enrolled in an undergraduate degree, students from the lower part of the socio-economic distribution are more likely to finish their studies faster, but their dropout rate or their probability of switching their degree program are not affected by the reform.

5.4 Labor Market Outcomes

In this section, we connect the effects of the 2006 higher education reform to labor market outcomes. Using the DLHE data, which follow students after they complete their studies in higher education, we investigate the long-run effects of the funding changes. We focus on the work status of the students measured six months after graduation. If they are working, we look at the type of contract, as well as their earnings.

Table 13 shows that, overall, earnings increase very slightly (Column [1]). However, the increase is entirely accounted for by the highest socio-economic group (2.7 percentage points), while there is a negative effect on the middle and lowest groups (relative fall of 0.9 and 1.7 percentage points, respectively). When we control for field of study and university fixed effects, the directions of the effects are the same, with very slight changes in magnitudes (Columns [3] and [4]). Restricting the analysis to full-time workers only (column [5]), the results remain unchanged.

Table 14 shows that, overall, the reform has a small positive effect on engaging in further education (an increase of one percentage point) (Column [9]), with no significant impact on employment or unemployment (Columns [1] and [5], respectively). However, across the distribution, there are some differences. In particular, for the lowest socio-economic group, we do see a relatively lower likelihood of employment (Columns [2] to [4]) and a higher likelihood of unemployment (Columns [6] to [8]), but no effect on entering further education (Columns [10] to [12]). This suggests an increase in the gap in employment prospects for low versus high socio-economic groups.

Similarly, Table 15 suggests that, conditional on being employed, the 2006 reform had little overall effect on the type of contract - temporary or permanent (Columns [5] to [12]). However, we do see a reduced likelihood that students will be employed full-time (a drop of 1.6 percentage points) (Column [1]). Moreover, the effect is stronger for the lower socio-economic group (Column [2]).

Although the impacts of the 2006 reform on labor-related outcomes are small, there do seem to be some differences across the distribution. These differences might be related to the differential behavior with respect to higher education-related choices. However, all results are robust to the inclusion of field of study fixed effects and university fixed effects (Columns [3] and [4] in Table 12, Columns [3], [4], [7], [8], [11], [12] in Table 13 and Columns [3], [4], [7], [8], [11], [12] in Table 14).

5.5 Reform of 2012

Although it is too early to study the medium- to long-run impacts of the 2012 higher education funding reform, in this section we briefly analyze the enrollment impact.

Table 16 presents the results from estimating equation (1) for the 2012 reform. The structure of the table is similar to Table 3. The estimated effects of the 2012 reform are similar to those of the 2006 reform. The baseline fall is around 0.3 percentage points (Column [1]) but once we add educational controls, school and neighborhood fixed effects, we find a fall in enrollment by 0.5 percentage points (Column [7]).

Table 17 shows the heterogeneous effects by socio-economic group for the 2012 reform. Once again, as with the 2006 reform, we find a differential effect across groups that favors those from lower socio-economic backgrounds. Overall, when comparing socio-economic groups, it seems that the new reform closed the gap in the probability of enrolling in a

university by approximately 4 percentage points. The closure of this gap is somewhat larger than the 2006 reform (Table 6).

The results suggest that, despite the large increase in fees between 2006 and 2012 (from £3,000 to £9,000), the overall impact is similar (and small). Once again, in conjunction with the rise in fees, changes in maintenance grants and access to loans favored those from lower socio-economic groups. Moreover, the timing of repayment of fees and the structure of the fee repayment (i.e., once earning above a given threshold) continued to hold. In fact, this too improved in favor of those expecting to earn less since the threshold of repayment increased to around £21,000 in 2012. Moreover, while loans remained repayable with low rates of interest (1.25 percent in 2006 and in 2012), for those earning above £41,000, the interest rate was set at the maximum of RPI plus 3 percent.

6 Conclusion

Despite its growing interest, the intended (and unintended) consequences of the introduction of, and increase in, tuition fees have been unclear. Focusing on the impact on redistribution, it is often believed that, because of the differential financing constraints across socio-economic groups and the implied debt of shifting the burden onto students, this move can be harmful. In this paper, we estimate the short- and longer-run effects of major reforms in higher education financing that took place in recent years in England. For a number of reasons, these national reforms are a good laboratory to test the implications, including the fact that, unlike in countries like the US, the coverage of the system was almost universal and the fee regime and amounts were homogeneous across all individuals and institutions. Moreover, we can study whether the expansion of means-tested (cash) grants and loans can mitigate the impact of tuition fees on the lower socio-economic groups.

Overall, we find only small negative effects of the higher education financing reforms on participation and any decreases are borne mostly by those from the higher parts of the socio-economic distribution. We find for the group not eligible for means-tested cash grants, a change in fees of £1,000 corresponds to a small drop in enrollment by around 0.025 percentage points. For those eligible for grants, there is an offsetting effect, such that the compound effect is not statistically significant (or small but positive). With respect to other margins – geographic mobility, university choice, field of study choice, length to completion of the program, and (short-run) labor market impacts – we also find small effects. For instance, it seems that students do select universities that are marginally closer to home, suggesting they readjust on dimensions other than participation. Again, these differences do not seem to negatively impact students from lower socio-economic backgrounds more. Looking more closely at the different components within the financing reforms, it seems that increases in means-tested maintenance (cash) grants are largely responsible for offsetting the negative effect from tuition fees.

The modest effects of the English higher education funding reform on the "intensive" and "extensive" margins contrast with the large budget savings. Part of the explanation for why the effects are small might relate to the structure of the system, which allows students to enroll at no ex-ante financial cost - reducing the barriers to entry. Moreover, by introducing progressivity in fees through a system of means-tested grants and loans, students from lower-income household additionally experience a relief of financing constraints.

One key question that remains is whether these reforms are cost-effective in the longer run. Higher education is a risky investment, and the student loans to which students in England have access include some insurance. In particular, graduates repay the tuition fees loans only once they have attained a predetermined income threshold. As stipulated in the 2006 and 2012 reforms, this stood at a threshold of around £15,000 and £21,000, respectively. Moreover, any remaining debt would be written off after 30 years. This suggests that some graduates will never be able to repay their loan in full. Although it is still too early to estimate the repayment rates for those affected by the 2012 reform, studies have projected that, under the 2012 regime, 73 percent of graduates will not repay their debt in full within the repayment period, compared with only 32 percent under the 2006 regime (Crawford and Jin (2014)). With respect to equity, however, the system of free higher education is likely to be regressive, since more than 50 percent of high school graduates do not go to college and these are disproportionally from low-income households. In the absence of a graduate tax (in the form of deferred repayments), higher education is typically absorbed into general taxation.

An important next step would be to understand if, and by how much, the change in the tax system redistributes from lower- to higher-income individuals. Recent research explores different funding methods, finding that an income-contingent loan systems, similar to that of England, compared with general tax-financed higher education, are more progressive and cost-saving for the government (Cabrales, Guell, Madera and Viola (2019); Diris and Ooghe (2018)).[27] The results suggest that the reforms did not negatively impact university enrollment among students from lower socio-economic groups. It might be that a budget-neutral reform that increases fees and channels these funds to means-tested support can potentially be effective. Moreover, actions that reduce financing constraints and that link repayment to future income can be a cost-effective way to promote university education. However, it is important to look deeper at the socio-economic distribution - while the system might have adversely affected students on the margin from entering university, the system could potentially be improved to promote attendance among those lower in the distribution.

[27]Cabrales, Guell, Madera and Viola (2019) set up a loan laboratory applied to Spain to explore the distributional effects of different loan finance tertiary education systems and looked at simulated lifetime earnings of graduates. They find that an income-contingent loan system is highly progressive, with the top quarter of the distribution paying close to the full amount of the tuition and the bottom 10% paying almost no tuition. Diris and Ooghe (2018) calculate the private returns across the OECD, confirming that private incentives to invest in higher education are high. With respect to financing, they find that for many countries, tax-financed subsidies are regressive and that shifting towards income-contingent loans or graduate taxes is appropriate when taking into account both efficiency and equity considerations.

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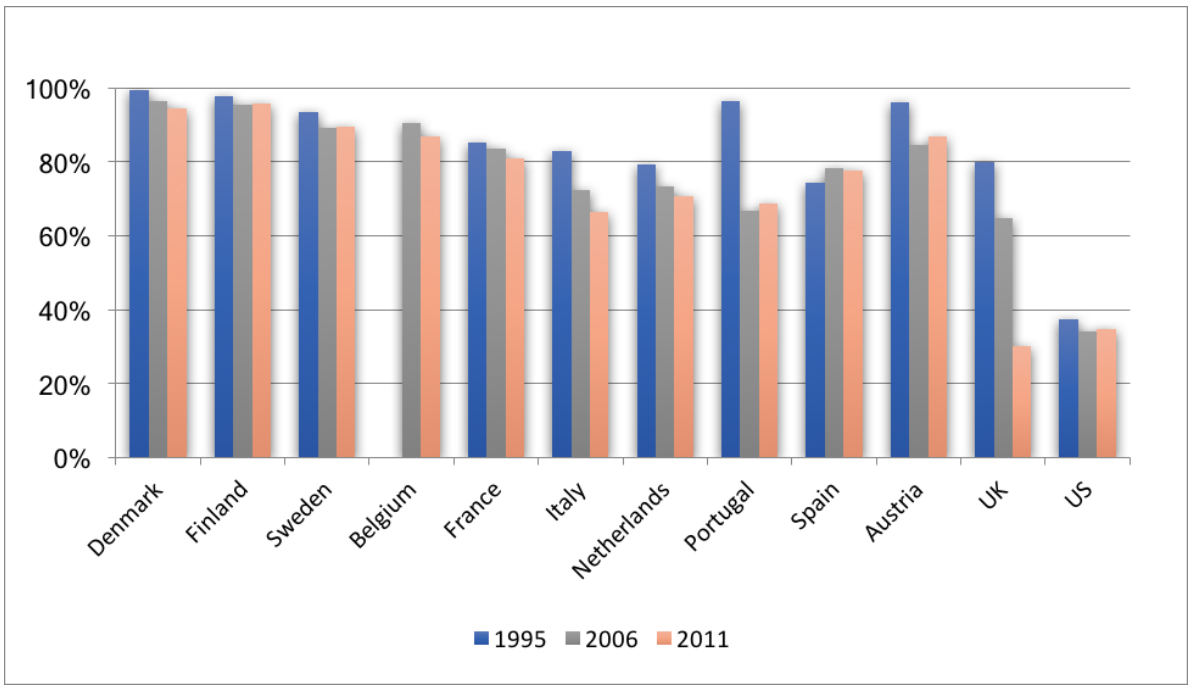
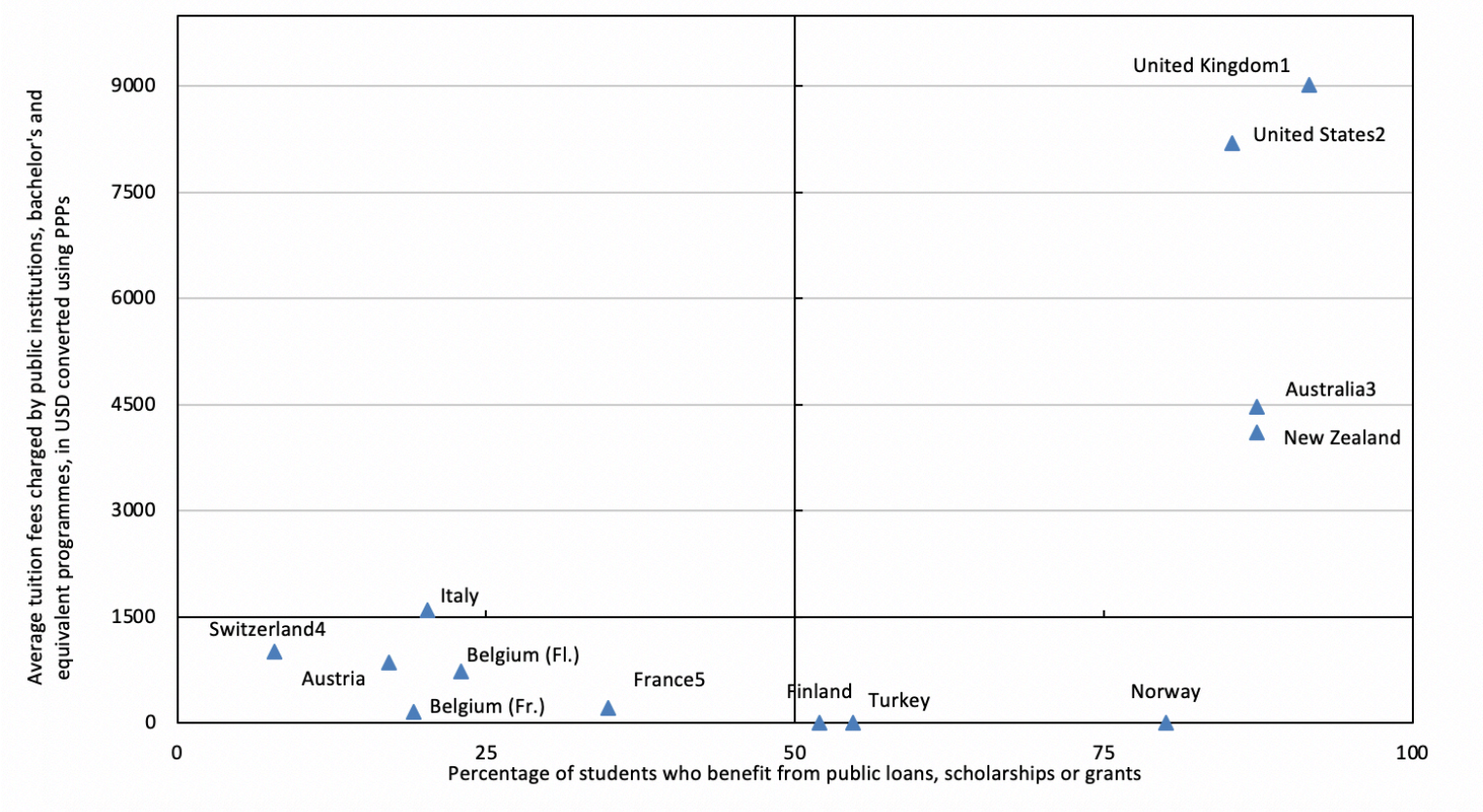
Figures

Figure 1: Share of Higher Education Costs Covered by Public Expenditure



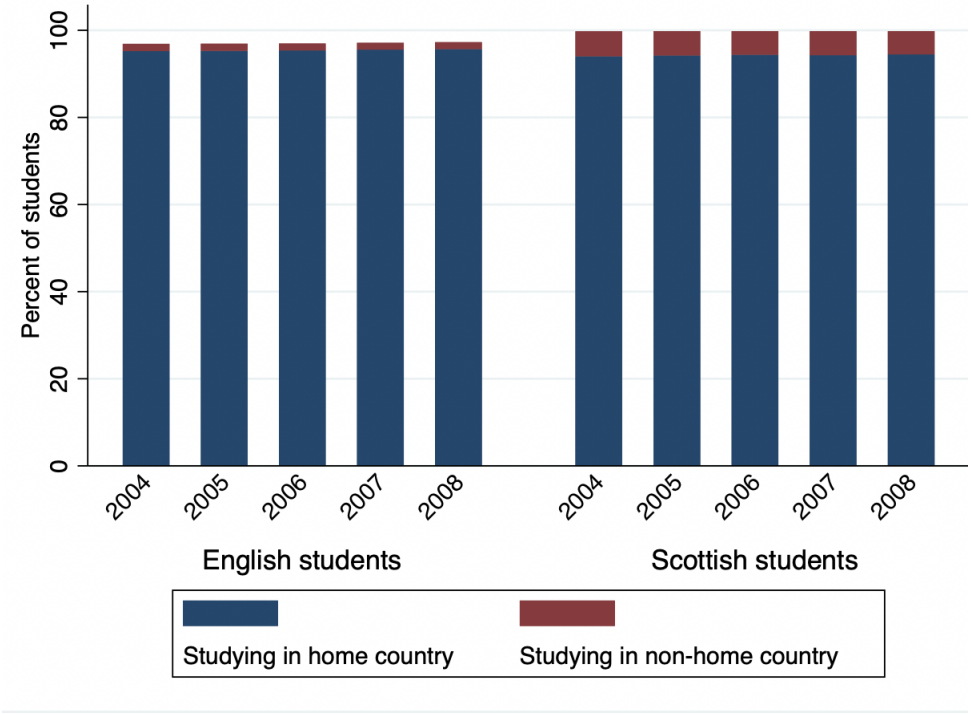
Notes: The graph shows the trends in the share of higher education costs, covered by public expenditure across different countries.
Source: OECD (2014)

Figure 2: Tuition Fees vs Means-Tested Support in 2013



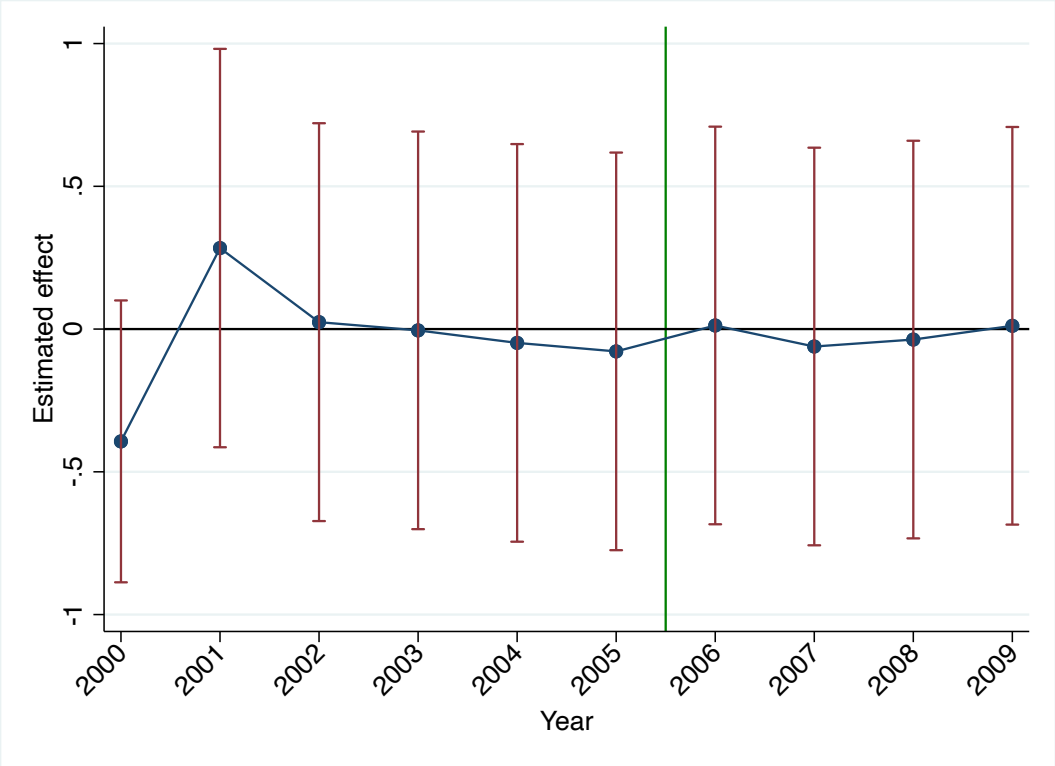
Notes: The graph plots the relationship between the average tuition fees charged by public higher education institutions in different OECD countries in academic year 2013/14 against the percentage of enrolled students who benefit from public loans, scholarships or grants at bachelor's or equivalent level. It refers to full-time nation students only and the level of tuition fees is expressed in USD converted using the PPPs for GDP.
1. Refers only to England. 2 Reference year 2011/12. 3. Only includes the major Australian Government scholarships programmes - it excludes all scholarships provided by educational institutions and the private sector. 4. Financial reference year 2013 and academic reference year 2012/13. 5. Tuition fees range from USD 2015 to USE 175 for university programmes depending on the Ministry of Higher Education.
Source: Based on B5.3 from OECD (2016)

Figure 3: Percentage of Full-Time First Degree UG Students by Domicile and Region of University



Notes: The plot shows the share of English and Scottish domiciled students that pursued an undergraduate degree in their home country (i.e., in England for English students and in Scotland for Scottish students) and English and Scottish domiciled students that did not pursue an undergraduate degree in their home country (i.e., English students enrolled in Scottish universities and Scottish students enrolled in English universities).
Source: HESA statistics.

Figure 4: Event study of the effect of the 2006 HE Reform on the number of enrolled 1st year UG students



Notes: The outcome variable is the hyperbolic transformation of the total number of 1st year full-time UG students enrolled in each year and university. The reported estimates correspond to interaction terms between year categorical values and the treatment variable - defined as 1 if the students are domiciled in England and 0 if they are domiciled in Scotland. The 95% confidence intervals are also reported. The regression controls for time FE.
Source: The data covers the 2000/01-2009/10 and it is provided by HESA.

Tables

Table 1: Available Tuition and Maintenance Financial Support by Income Brackets

Parental Income (£)	Tuition Fees (£)				Tuition Fees Loans (£)				Maintenance Grants (£)				Available Maintenance Loans (£)			
	1998	2004	2006	2012	1998	2004	2006	2012	1998	2004	2006	2012	1998	2004	2006	2012
$\leq$ 10,000	0	0	3,000	9,000	0	0	3,000	9,000	949	1,040	2,700	3,250	2,255	4,260	3,205[1]	3,875[4]
20,000	373	0	3,000	9,000	0	0	3,000	9,000	949	248	2,283	3,250	2,255	4,260	3,205[1]	3,875[4]
30,000	1,172	980	3,000	9,000	0	0	3,000	9,000	569	0	831	2,341	2,315	4,260	3,575[2]	4,330[4]
40,000	1,172	1,196	3,000	9,000	0	0	3,000	9,000	0	0	0	523	2,403	3,262	4,624[3]	5,239[4]
$\geq$ 50,000	1,172	1,196	3,000	9,000	0	0	3,000	9,000	0	0	0	0	2,403	3,199	3,305[3]	4,771[5]

Notes: The figures for the maintenance loans refer to students who do not study in London and do not live at home with their parents. The Maintenance Grant and the Maintenance Loan values used in the calculations represent the maximum level available per parental income group. [1] Students in lower-income households will have part of their maintenance needs met through a non-repayable Maintenance Grant. So, their entitlement to repayable support through a Student Loan for Maintenance will therefore be reduced to reflect this. In practice, this means that the amount of Maintenance Loan a student can receive will be reduced by £1 for every £1 of Maintenance Grant entitlement up to £1,200. [2] The Maintenance Loan is reduced by between £50 and £1,199 depending on the amount of Maintenance Grant received. [3] All students are entitled to 75% of the appropriate student loan, but the remaining 25% is subject to means-testing. [4] The amount of Maintenance Loan available is reduced by £0.50 for every £1 of Maintenance Grant received up to a maximum of £1,625. The maximum amount of support available is therefore lower than the sum of the maximum Maintenance Loan and the maximum Maintenance Grant. [5] All students are entitled to 65% of the appropriate maximum Maintenance Loan, but the remaining 35% is subject to means-testing. The full value is reduced to £3,575 for income above £62,126. *Source:* Student Loan Company, available at: `http://www.slc.co.uk/official-statistics/full-catalogue-of-official-statistics/student-support-for-higher-education-in-england.aspx` and Dearden, Fitzsimons and Wyness (2011).

Table 2: Upfront Costs and Available Financial Support

Parental Income (£)	Upfront Costs [Fees - Maint. Grants]				Available Financial Support [Fee Loans+Maint. Support]			
	1998	2004	2006	2012	1998	2004	2006	2012
$\leq$ 10,000	-949	-1,040	300	5,750	3,204	5,300	8,905	16,125
20,000	-576	-248	717	5,750	3,204	4,508	8,488	16,125
30,000	603	980	2,169	6,659	2,884	4,260	7,404	15,671
40,000	1,172	1,196	3,000	8,477	2,403	3,262	7,624	14,762
$\geq$ 50,000	1,172	1,196	3,000	9,000	2,403	3,199	6,305	13,771

Notes: The Upfront Costs are calculated as the level of Tuition Fees minus the Maintenance Grants. The Available Financial Support is calculated as the sum of the Tuition Fees Loans, the Maintenance Loans and the Maintenance Grants. All calculations are done based on the the figures from Table 1, referring to students who do not study in London and do not live at home with their parents. The Maintenance Grant and the Maintenance Loan values used in the calculations represent the maximum level available per parental income group.

Table 3: Summary Statistics

	Period 2004/05-2005/06			Period 2006/07-2009/10		
	Mean [1]	SD [2]	N [3]	Mean [4]	SD [5]	N [6]
Panel A: Controls						
Female	0.485	0.500	898,303	0.486	0.500	1,917,947
White	0.851	0.356	898,303	0.856	0.351	1,917,952
High socio-economic Index	0.318	0.466	898,303	0.318	0.466	1,917,952
Medium socio-economic Index	0.335	0.472	898,303	0.336	0.472	1,917,952
Low socio-economic Index	0.347	0.476	898,303	0.346	0.476	1,917,952
Free School Meal	0.148	0.355	897,709	0.141	0.349	1,917,952
No Full GCSE Entries	8.111	2.386	898,292	7.577	2.638	1,917,952
No Astar GCSEs	0.270	1.061	898,292	0.307	1.164	1,917,952
No A GCSEs	0.724	1.557	898,292	0.748	1.572	1,917,952
No B GCSEs	1.221	1.805	898,292	1.204	1.777	1,917,952
No C GCSEs	1.894	2.084	898,292	1.869	2.051	1,917,952
No D GCSEs	1.558	1.754	898,292	1.424	1.657	1,917,952
Panel B: Outcome Variables						
Enrollment	0.235	0.424	898,303	0.239	0.427	1,917,952
Ln (Distance between Home and Uni)	3.849	1.273	211,234	3.849	1.260	459,071
Same Commuting Area	0.206	0.404	211,234	0.201	0.400	459,072
Russell Group	0.228	0.420	211,234	0.215	0.413	459,072
Study Medicine	0.223	0.416	211,234	0.237	0.425	459,072
Study STEM	0.205	0.403	211,234	0.204	0.403	459,072
Study Social Sciences	0.304	0.460	211,234	0.305	0.461	459,072
Study Languages	0.132	0.339	211,234	0.120	0.324	459,072
Study Art or Education	0.136	0.343	211,234	0.134	0.341	459,072
Employed	0.631	0.483	150,109	0.631	0.482	330,355
Unemployed	0.070	0.256	150,109	0.078	0.268	330,355
Further Studies	0.237	0.425	150,109	0.233	0.423	330,355
Permanent Contract	0.643	0.479	81,976	0.623	0.485	193,851
Full Time Employed	0.861	0.346	94,687	0.798	0.402	208,500
Ln (Annual Earnings)	9.627	0.279	46,273	9.537	0.295	109,589

Notes: The variables in panel A refer to all students in English state schools who sat the GCSEs between 2001/02-2002/03 (the period before the reform) and between 2003/04-2006/07 (the period after the reform). The outcome variables presented in panel B refer only to students enrolled in a university in England at age 18, except for the enrollment variables which includes both students who did not enroll into university and those who enrolled at age 18 in an English university.

Table 4: University Enrollment

	All [1]	All [2]	All [3]	All [4]	All [5]	All [6]	All [7]	All [8]
2006 HE Reform	0.004***	-0.010***	-0.008***	-0.008***	-0.005***	-0.005***	-0.005***	-0.005***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Trend		0.000	-0.013***	-0.011***	-0.012***	-0.013***	-0.013***	-0.013***
		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Trend Squared		0.001***	0.003***	0.003***	0.003***	0.002***	0.002***	0.002***
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Ln (Cohort Size)			0.265***	0.264***	0.227***	0.299***	0.299***	0.299***
			(0.020)	(0.019)	(0.019)	(0.014)	(0.014)	(0.017)
Female					0.079***	0.005***	0.004***	0.004***
					(0.000)	(0.000)	(0.000)	(0.001)
White					-0.106***	-0.082***	-0.082***	-0.082***
					(0.001)	(0.001)	(0.001)	(0.002)
Socio-economic Index					-1.420***	-0.756***	-0.629***	-0.629***
					(0.091)	(0.079)	(0.075)	(0.083)
No. A* grades at GCSEs						0.098***	0.098***	0.098***
						(0.000)	(0.000)	(0.000)
No. A grades at GCSEs						0.103***	0.103***	0.103***
						(0.000)	(0.000)	(0.000)
No. B grades at GCSEs						0.076***	0.076***	0.076***
						(0.000)	(0.000)	(0.000)
No. C grades at GCSEs						0.031***	0.031***	0.031***
						(0.000)	(0.000)	(0.000)
No. D grades at GCSEs						-0.001***	-0.001***	-0.001***
						(0.000)	(0.000)	(0.000)
No. of full GCSEs entries						-0.006***	-0.006***	-0.006***
						(0.000)	(0.000)	(0.000)
Constant	0.235***	0.234***	-3.288***					
	(0.000)	(0.001)	(0.265)					
Neighborhood FE	No	No	No	Yes	Yes	Yes	Yes	Yes
School FE	No	No	No	No	No	No	Yes	Yes
Observations	2,816,255	2,816,255	2,816,255	2,816,241	2,816,236	2,816,225	2,815,531	2,815,531
R-squared	0.000	0.000	0.000	0.113	0.127	0.520	0.524	0.524

Notes: The outcome is a categorical variable equal to 1 if the student is enrolled into an English university at age 18 and 0 otherwise. The regressions refer to the 2006 reform and include data on 1st year UG students enrolled between 2004/05-2009/10. The neighborhood FE are defined using the lower layer super output are where the student was residing at age 16 (we use around 32,400 regions). The school FE are defined as the school attended by the student at age 16, when they sat the GCSEs. * denotes significance at the 10% level, ** denotes significance at the 5% level, and *** denotes significance at the 1% level. Robust standard errors in parentheses. Robust standard errors clustered at the school enrolled (at age 16) level, in parentheses in column [8].

Table 5: University Enrollment - by Socio-Economic Status

	High socio-economic Index		Medium socio-economic Index		Low socio-economic Index	
	[1]	[2]	[3]	[4]	[5]	[6]
2006 HE Reform	-0.015***	-0.009***	-0.000	-0.003	0.001	-0.003*
	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)
Trend	-0.016***	-0.020***	-0.014***	-0.013***	-0.006***	-0.005***
	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Trend Squared	0.004***	0.003***	0.003***	0.002***	0.002***	0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Ln (Cohort Size)	0.381***	0.433***	0.245***	0.282***	0.142***	0.199***
	(0.040)	(0.031)	(0.034)	(0.027)	(0.028)	(0.022)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Education Controls	No	Yes	No	Yes	No	Yes
Neighborhood FE	Yes	Yes	Yes	Yes	Yes	Yes
School FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	895,101	895,099	944,236	944,231	975,338	975,334
R-squared	0.164	0.519	0.160	0.505	0.156	0.476

Notes: The outcome is a categorical variable equal to 1 if the student is enrolled into an English university at age 18 and 0 otherwise. The regressions refer to the 2006 reform and include data on 1st year UG students enrolled between 2004/05-2009/10. Columns [1] and [2] refer only to students in the high socio-economic index group; columns [3] and [4] refer only to students in the medium socio-economic index group; columns [5] and [6] refer only to students in the low socio-economic index group. The neighborhood FE are defined using the lower layer super output are where the student was residing at age 16 (we use around 32,400 regions). The school FE are defined as the school attended by the student at age 16, when they sat the GCSEs. The controls are female and white categorical variables and the socio-economic index. The education controls are the number of full GCSE taken, the number of A* marks in GCSE, the number of A marks in GCSE, the number of B marks in GCSE, the number of C marks in GCSE and the number of D marks in GCSE.* denotes significance at the 10% level, ** denotes significance at the 5% level, and *** denotes significance at the 1% level. Robust standard errors clustered at the school enrolled (at age 16) level in parentheses.

Table 6: University Enrollment - Gaps by Socio-Economic Status

	All	All	All	All
	[1]	[2]	[3]	[4]
2006 HE Reform	-0.014***	-0.014***	-0.013***	
	(0.002)	(0.002)	(0.001)	
2006 HE Reform * Medium SES	0.011***	0.011***	0.009***	0.009***
	(0.001)	(0.001)	(0.001)	(0.001)
2006 HE Reform * Low SES	0.019***	0.018***	0.016***	0.016***
	(0.001)	(0.001)	(0.001)	(0.001)
Medium SES	-0.102***	-0.016**	-0.015***	-0.015***
	(0.002)	(0.007)	(0.005)	(0.005)
Low SES	-0.185***	-0.023**	-0.017**	-0.017**
	(0.002)	(0.010)	(0.007)	(0.007)
Trend	-0.012***	-0.012***	-0.013***	
	(0.001)	(0.001)	(0.001)	
Trend Squared	0.003***	0.003***	0.002***	
	(0.000)	(0.000)	(0.000)	
Ln (Cohort Size)	0.224***	0.247***	0.298***	
	(0.021)	(0.021)	(0.017)	
Controls	Yes	Yes	Yes	Yes
Education Controls	No	No	Yes	Yes
Neighborhood FE	No	Yes	Yes	Yes
School FE	Yes	Yes	Yes	Yes
Time FE	No	No	No	Yes
Observations	2,815,556	2,815,542	2,815,531	2,815,531
R-squared	0.166	0.193	0.524	0.524

Notes: The outcome is a categorical variable equal to 1 if the student is enrolled into an English university at age 18 and 0 otherwise. The regressions refer to the 2006 reform and include data on 1st year UG students enrolled between 2004/05-2009/10. The neighborhood FE are defined using the lower layer super output are where the student was residing at age 16 (we use around 32,400 regions). The school FE are defined as the school attended by the student at age 16, when they sat the GCSEs. The controls are female and white categorical variables . The education controls are the number of full GCSE taken, the number of A* marks in GCSE, the number of A marks in GCSE, the number of B marks in GCSE, the number of C marks in GCSE and the number of D marks in GCSE. * denotes significance at the 10% level, ** denotes significance at the 5% level, and *** denotes significance at the 1% level. Robust standard errors clustered at the school enrolled (at age 16) level in parentheses.

Table 7: Weighted Analysis of University Enrollment: Predicted Probabilities of Maintenance Grant Eligibility

	No Maintenance Grant	Partial Maintenance Grant	Full Maintenance Grant
	[1]	[2]	[3]
2006 HE Reform	-0.005***	-0.003***	0.008***
	(0.001)	(0.001)	(0.002)
Trend	-0.012***	-0.013***	-0.017***
	(0.002)	(0.001)	(0.002)
Trend Squared	0.002***	0.002***	0.003***
	(0.000)	(0.000)	(0.000)
Ln (Cohort Size)	0.304***	0.285***	0.286***
	(0.023)	(0.017)	(0.029)
Controls	Yes	Yes	Yes
Education Controls	Yes	Yes	Yes
Neighborhood FE	Yes	Yes	Yes
School FE	Yes	Yes	Yes
Observations	2,816,606	2,816,606	2,816,606
R-squared	0.544	0.516	0.459

Notes: The outcome is a categorical variable equal to 1 if the student is enrolled into an English university at age 18 and 0 otherwise. The regressions refer to the 2006 reform and include data on 1st year UG students enrolled between 2004/05-2009/10. Regression [1] is weighted by the predicted probability that a student will be eligible for a no maintenance grant. Regression [2] is weighted by the predicted probability that a student will be eligible for a partial maintenance grant. Regression [3] is weighted by the predicted probability that a student will be eligible for a full maintenance grant. Table B.1. in Appendix B shows how the eligibility has been determined in each academic year, based on the household income. The neighborhood FE are defined using the lower layer super output are where the student was residing at age 16 (we use around 32,400 regions). The school FE are defined as the school attended by the student at age 16, when they sat the GCSEs. The controls are female and white categorical variables and the socio-economic index . The education controls are the number of full GCSE taken, the number of A* marks in GCSE, the number of A marks in GCSE, the number of B marks in GCSE, the number of C marks in GCSE and the number of D marks in GCSE. * denotes significance at the 10% level, ** denotes significance at the 5% level, and *** denotes significance at the 1% level. Robust standard errors clustered at the school enrolled (at age 16) level in parentheses.

Table 8: Differences-in-Differences Analysis: University Enrollment

	ALL	ALL	High SES	Med SES	Low SES
	[1]	[2]	[3]	[4]	[5]
2006 HE Reform*Treatment	-0.093	-0.0174	-0.060	-0.134	0.074
	(0.162)	(0.064)	(0.096)	(0.116)	(0.124)
Treatment	-0.172*	2.621***	3.298***	2.375***	1.732***
	(0.102)	(0.052)	(0.078)	(0.093)	(0.100)
MediumSES		-0.431***			
		(0.032)			
Low SES		-0.628***			
		(0.033)			
Controls	No	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes
Observations	1,264	17,654	6,750	5,624	5,280
R-squared	0.012	0.340	0.452	0.299	0.232

Notes: The outcome variable in column [1] is the hyperbolic transformation of the total number of 1st year full-time UG students enrolled in each year and university and includes data on students enrolled between 2000/01-2009/10. The outcome variables in columns [2]-[5] is the hyperbolic transformation of the total number of 1st year full-time UG students accepted in each university, age and socio-economic group between 2004/05-2009/10. Treatment takes value 1 if student is and English domiciled student and 0 if student is a Scottish domiciled student. Column [1] is estimated using HESA data, while columns [2] to [5] are estimated using UCAS data. Column [2] refers to the entire sample. Column [3] restricts the sample to the High SES group (i.e., students with a parent in a higher managerial, professional and lower managerial occupations). Column [4] restricts the sample only to the Medium SES group (i.e., students with a parent in a intermediate, lower supervisory and technical occupations and being small employers and own account workers). Column [5] restricts the sample only the Low SES group (i.e. students with parents having routine or semi-routine occupations). The controls are female, age and socio-economic categorical variables in column [2] and only female and age categorical variables in the columns [3] to [5]. * denotes significance at the 10% level, ** denotes significance at the 5% level, and *** denotes significance at the 1% level. Robust standard errors in parentheses.

Table 9: Geographical Mobility

	Ln (Distance between Uni and Home)			Pr(Same Commuting Area)		
	[1]	[2]	[3]	[4]	[5]	[6]
2006 HE Reform	-0.026***	-0.036***	-0.044***	0.008***	0.010***	0.012***
	(0.008)	(0.008)	(0.008)	(0.003)	(0.003)	(0.003)
2006 HE Reform * Medium SES		0.003	0.008		0.001	0.000
		(0.007)	(0.007)		(0.002)	(0.002)
2006 HE Reform * Low SES		0.049***	0.061***		-0.016***	-0.018***
		(0.009)	(0.009)		(0.003)	(0.003)
Medium SES	-0.035	-0.037	-0.049	0.011	0.011	0.013
	(0.037)	(0.038)	(0.037)	(0.011)	(0.011)	(0.011)
Low SES	0.017	-0.010	-0.030	-0.005	0.003	0.006
	(0.066)	(0.066)	(0.064)	(0.020)	(0.020)	(0.020)
Trend	0.011	0.011	-0.001	-0.001	-0.001	0.001
	(0.008)	(0.008)	(0.008)	(0.003)	(0.003)	(0.003)
Trend Squared	0.001	0.001	0.003**	-0.001**	-0.001**	-0.001***
	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)
Ln (Cohort Size)	-0.133	-0.132	0.087	-0.040	-0.041	-0.082**
	(0.121)	(0.121)	(0.120)	(0.038)	(0.038)	(0.038)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Education Controls	No	No	Yes	No	No	Yes
Neighborhood FE	Yes	Yes	Yes	Yes	Yes	Yes
School FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	669,924	669,924	669,924	669,924	669,924	669,924
R-squared	0.327	0.327	0.354	0.323	0.324	0.332

Notes: The outcome in the first three columns is the geographical distance between the student's home measured at age 16 and the university enrolled in at age 18, expressed in km. The outcome in columns [4] to [6] is is a categorical variable equal to 1 if the student is enrolled into a university located in the same commuting area as their residency at age 16. The regressions refer to the 2006 reform and include data on 1st year UG students enrolled between 2004/05-2009/10. The neighborhood FE are defined using the lower layer super output are where the student was residing at age 16 (we use around 32,400 regions). The school FE are defined as the school attended by the student at age 16, when they sat the GCSEs. The controls are female and white categorical variables. The education controls are the number of full GCSE taken, the number of A* marks in GCSE, the number of A marks in GCSE, the number of B marks in GCSE, the number of C marks in GCSE and the number of D marks in GCSE. * denotes significance at the 10% level, ** denotes significance at the 5% level, and *** denotes significance at the 1% level. Robust standard errors clustered at the school enrolled (at age 16) level in parentheses

Table 10: University Quality

	Normalised Rank			Pr(Russell Group University)			Pr(Study in London)			
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
2006 HE Reform	0.009	0.019**	0.005	0.015***	0.017***	0.010***	0.004**	0.009***	0.008***	0.004***
	(0.008)	(0.008)	(0.007)	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)
2006 HE Reform * Medium SES		-0.008	0.002		-0.002	0.003		-0.005***	-0.004**	-0.001
		(0.006)	(0.006)		(0.003)	(0.002)		(0.002)	(0.002)	(0.001)
2006 HE Reform * Low SES		-0.040***	-0.021***		-0.009***	-0.001		-0.018***	-0.016***	0.002
		(0.008)	(0.008)		(0.003)	(0.003)		(0.002)	(0.002)	(0.002)
Medium SES	0.027	0.032	0.019	-0.009	-0.008	-0.015	-0.011	-0.008	-0.008	-0.006
	(0.033)	(0.033)	(0.028)	(0.014)	(0.014)	(0.012)	(0.009)	(0.009)	(0.009)	(0.009)
Low SES 3.0000	0.013	0.035	-0.008	0.007	0.012	-0.008	-0.015	-0.005	-0.008	-0.003
	(0.055)	(0.055)	(0.046)	(0.023)	(0.023)	(0.020)	(0.015)	(0.015)	(0.015)	(0.014)
Trend	0.028***	0.028***	-0.003	0.012***	0.012***	0.002	-0.001	-0.001	-0.001	-0.001
	(0.008)	(0.008)	(0.007)	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)
Trend Square	-0.003**	-0.003**	0.001	-0.003***	-0.003***	-0.002***	-0.000	-0.000	-0.000	0.000
	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Ln (Cohort Size)	0.376***	0.376***	0.859***	-0.410***	-0.410***	-0.241***	0.024	0.024	0.023	0.014
	(0.127)	(0.127)	(0.117)	(0.043)	(0.043)	(0.039)	(0.027)	(0.027)	(0.027)	(0.024)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Education Controls	No	No	Yes	No	No	Yes	No	No	Yes	Yes
Neighborhood FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
School FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	650,232	650,232	650,232	669,924	669,924	669,924	669,924	669,924	669,924	567,794
R-squared	0.188	0.188	0.409	0.140	0.140	0.325	0.288	0.288	0.291	0.118

Notes: The outcome in the first three columns is the geographical distance between the student's home measured at age 16 and the university enrolled in at age 18, expressed in km. The outcome in columns [4] to [6] is a categorical variable equal to 1 if the university in which the student is enrolled at age 18 is in area with house prices above the national median. The outcome in columns [7] to [10] is a categorical variable equal to 1 if the university in which the student is enrolled at age 18 is located in London. Column [10] excludes students who are from London. The regressions refer to the 2006 reform and include data on 1st year UG students enrolled between 2004/05-2009/10. The neighborhood FE are defined using the lower layer super output are where the student was residing at age 16 (we use around 32,400 regions). The school FE are defined as the school attended by the student at age 16, when they sat the GCSEs. The controls are female and white categorical variables. The education controls are the number of full GCSE taken, the number of A* marks in GCSE, the number of A marks in GCSE, the number of B marks in GCSE, the number of C marks in GCSE and the number of D marks in GCSE. * denotes significance at the 10% level, ** denotes significance at the 5% level, and *** denotes significance at the 1% level. Robust standard errors clustered at the school enrolled (at age 16) level in parentheses

Table 11: Probability to Pursue a Highly Paid Field of Study

	All	All	All
	[1]	[2]	[3]
2006 HE Reform	0.006	0.013***	0.011***
	(0.003)	(0.004)	(0.004)
2006 HE Reform * Medium SES		-0.011***	-0.010***
		(0.003)	(0.003)
2006 HE Reform * Low SES		-0.019***	-0.019***
		(0.004)	(0.004)
Medium SES	-0.046***	-0.040**	-0.041**
	(0.017)	(0.017)	(0.017)
Low SES	-0.062**	-0.052*	-0.055*
	(0.029)	(0.029)	(0.029)
Trend	0.006*	0.006*	0.003
	(0.003)	(0.003)	(0.003)
Trend Squared	-0.001*	-0.001*	-0.001
	(0.001)	(0.001)	(0.001)
Ln (Cohort Size)	-0.448***	-0.448***	-0.392***
	(0.051)	(0.051)	(0.050)
Controls	Yes	Yes	Yes
Education Controls	No	No	Yes
Neighborhood FE	Yes	Yes	Yes
School FE	Yes	Yes	Yes
Observations	666,381	666,381	666,381
R-squared	0.113	0.113	0.122

Notes: The outcome is a categorical variable equal to 1 if the student has pursued a degree with a wage above the median of the expected wages by field of study pursued. The regressions refer to the 2006 reform and include data on 1st year UG students enrolled between 2004/05-2009/10. The neighborhood FE are defined using the lower layer super output are where the student was residing at age 16 (we use around 32,400 regions). The school FE are defined as the school attended by the student at age 16, when they sat the GCSEs. The controls are female and white categorical variables. The education controls are the number of full GCSE taken, the number of A* marks in GCSE, the number of A marks in GCSE, the number of B marks in GCSE, the number of C marks in GCSE and the number of D marks in GCSE. * denotes significance at the 10% level, ** denotes significance at the 5% level, and *** denotes significance at the 1% level. Robust standard errors clustered at the school enrolled (at age 16) level in parentheses

Table 12: Behavior within University

	Number of years it took to get a degree									Pr(switch degree)			Pr(drop out)		
	All	All	All	All	Medicine	STEM	Social Science	Languages	Arts	All	All	All	All	All	All
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]
2006 HE Reform	0.010*	0.016***	0.009	0.007	0.027*	-0.019	0.024***	-0.010	-0.005	0.002	0.001	-0.001	0.002	0.004	0.006**
	(0.005)	(0.006)	(0.006)	(0.005)	(0.016)	(0.015)	(0.009)	(0.014)	(0.016)	(0.003)	(0.004)	(0.004)	(0.002)	(0.003)	(0.002)
2006 HE Reform * Medium SES		-0.006	-0.002	-0.004	-0.006	0.002	-0.008	-0.012	-0.017		0.002	0.003		-0.004*	-0.005**
		(0.005)	(0.005)	(0.004)	(0.014)	(0.013)	(0.008)	(0.013)	(0.014)		(0.003)	(0.003)		(0.002)	(0.002)
2006 HE Reform * Low SES		-0.024***	-0.017***	-0.015***	-0.051***	-0.020	-0.029***	-0.024	-0.020		0.005	0.007*		-0.002	-0.002
		(0.006)	(0.006)	(0.005)	(0.018)	(0.018)	(0.010)	(0.018)	(0.021)		(0.004)	(0.004)		(0.003)	(0.003)
Medium SES	-0.006	-0.003	-0.003	-0.001	-0.054	0.014	-0.001	-0.030	0.135*	0.030*	0.029*	0.027*	0.005	0.007	0.011
	(0.026)	(0.026)	(0.025)	(0.023)	(0.080)	(0.091)	(0.046)	(0.056)	(0.077)	(0.017)	(0.017)	(0.016)	(0.013)	(0.013)	(0.012)
Low SES	-0.021	-0.008	-0.019	-0.025	-0.146	-0.165	0.004	0.152	0.037	0.063**	0.060**	0.058**	-0.015	-0.014	-0.012
	(0.042)	(0.043)	(0.042)	(0.037)	(0.130)	(0.139)	(0.071)	(0.133)	(0.127)	(0.026)	(0.026)	(0.026)	(0.021)	(0.021)	(0.020)
Trend	-0.018***	-0.018***	-0.024***	-0.024***	-0.029**	-0.062***	-0.029***	-0.004	0.005	-0.042***	-0.042***	-0.044***	-0.005**	-0.005**	0.001
	(0.005)	(0.005)	(0.005)	(0.004)	(0.015)	(0.014)	(0.008)	(0.014)	(0.016)	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)
Trend Squared	-0.000	-0.000	0.000	0.001*	-0.003	0.008***	0.002*	-0.001	-0.002	0.000	0.000	0.000	-0.000	-0.000	-0.001***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)
Ln (Cohort Size)	-0.131*	-0.131*	-0.010	0.063	-0.501**	0.523**	0.367***	-0.101	-0.297	0.844***	0.844***	0.880***	0.042	0.042	-0.074**
	(0.075)	(0.075)	(0.073)	(0.064)	(0.209)	(0.210)	(0.122)	(0.204)	(0.235)	(0.049)	(0.049)	(0.049)	(0.038)	(0.037)	(0.036)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Education Controls	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	No	No	Yes
Neighborhood	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
School	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Field of Study FE	No	No	No	Yes	Yes	No	No	No	No	No	No	No	No	No	No
Observations	553,533	553,533	553,533	553,533	118,174	106,262	169,818	66,240	63,415	669,924	669,924	669,924	669,924	669,924	669,924
R-squared	0.090	0.090	0.122	0.301	0.393	0.282	0.195	0.342	0.365	0.078	0.078	0.083	0.084	0.084	0.152

Notes: The outcome in the first none columns is the number of years it took a student to graduate. The outcome in columns [10] to [12] is the probability to switch a degree. The outcome in columns [13] to [15] is the probability to dropout from a degree. The regressions refer to the 2006 reform and include data on 1st year UG students enrolled between 2004/05-2009/10. Regression [5] is restricted only to those who pursue a degree in Medicine, Dentistry or related degree. Regression [6] is restricted only to those who pursue a degree in STEM. Regression [7] is restricted only to those who pursue a degree in Social Sciences. Regression [8] is restricted only to those who pursue a degree in Languages or History. Regression [9] is restricted to those who pursue a degree in Arts, Education or other. The full description of each category of the degree is in table C.2. The neighborhood FE are defined using the lower layer super output are where the student was residing at age 16 (we use around 32,400 regions). The school FE are defined as the school attended by the student at age 16, when they sat the GCSEs. The controls are female and white categorical variables. The education controls are the number of full GCSE taken, the number of A* marks in GCSE, the number of A marks in GCSE, the number of B marks in GCSE, the number of C marks in GCSE and the number of D marks in GCSE. * denotes significance at the 10% level, ** denotes significance at the 5% level, and *** denotes significance at the 1% level. Robust standard errors clustered at the school enrolled (at age 16) level in parentheses

Table 13: Real Earnings (in £2001)

	All	All	All	All	All
	[1]	[2]	[3]	[4]	[5]
2006 HE Reform	0.025***	0.027***	0.026***	0.025***	0.025***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
2006 HE Reform * Medium SES		-0.009**	-0.009**	-0.008**	-0.007*
		(0.004)	(0.004)	(0.004)	(0.004)
2006 HE Reform * Low SES		-0.017***	-0.020***	-0.018***	-0.017***
		(0.005)	(0.005)	(0.005)	(0.006)
Medium SES	0.028	0.033	0.041**	0.041**	0.039*
	(0.021)	(0.021)	(0.020)	(0.021)	(0.024)
Low SES	0.061*	0.058	0.064*	0.068*	0.070*
	(0.036)	(0.036)	(0.035)	(0.036)	(0.039)
Trend	-0.062***	-0.065***	-0.068***	-0.069***	-0.068***
	(0.005)	(0.005)	(0.004)	(0.004)	(0.005)
Trend squared	0.004***	0.005***	0.005***	0.006***	0.006***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Ln (Cohort Size)	0.415***	0.454***	0.493***	0.519***	0.480***
	(0.070)	(0.067)	(0.066)	(0.065)	(0.070)
Controls	Yes	Yes	Yes	Yes	Yes
Education Controls	No	No	Yes	Yes	Yes
Neighborhood FE	Yes	Yes	Yes	Yes	Yes
School	Yes	Yes	Yes	Yes	Yes
Field of Study FE	No	No	Yes	Yes	Yes
University FE	No	No	No	Yes	Yes
Observations	151,968	151,968	150,065	150,065	135,958
R-squared	0.271	0.308	0.332	0.351	0.359

Notes: The outcome is the natural logarithm of the annual earnings, expressed in 2001 British pounds, for those employed 6 months after graduation. The regressions refer to the 2006 reform and include data on 1st year UG students enrolled between 2004/05-2009/10. In the last column the sample is restricted only to those in full-time employment. The neighborhood FE are defined using the lower layer super output are where the student was residing at age 16 (we use around 32,400 regions). The school FE are defined as the school attended by the student at age 16, when they sat the GCSEs. The controls are female and white categorical variables. The education controls are the number of full GCSE taken, the number of A* marks in GCSE, the number of A marks in GCSE, the number of B marks in GCSE, the number of C marks in GCSE and the number of D marks in GCSE.* denotes significance at the 10% level, ** denotes significance at the 5% level, and *** denotes significance at the 1% level. Robust standard errors clustered at the school enrolled (at age 16) level in parentheses.

Table 14: Employment Activity

	Pr(Employed)				Pr(Unemployed)				Pr(Further Study)			
	[1]	[2]	[3]	(4)	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
2006 HE Reform	-0.006	-0.002	-0.001	0.000	-0.003	-0.005**	-0.005**	-0.005**	0.010***	0.010***	0.010***	0.009**
	(0.004)	(0.004)	(0.004)	(0.004)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.004)	(0.004)	(0.004)
2006 HE Reform * Medium SES		-0.006	-0.006	-0.005		0.002	0.002	0.002		0.000	0.000	0.000
		(0.004)	(0.004)	(0.004)		(0.002)	(0.002)	(0.002)		(0.003)	(0.003)	(0.003)
2006 HE Reform *Low SES		-0.012***	-0.012***	-0.012***		0.011***	0.012***	0.012***		-0.004	-0.004	-0.005
		(0.004)	(0.004)	(0.004)		(0.003)	(0.003)	(0.003)		(0.004)	(0.004)	(0.004)
Medium SES	0.001	0.004	0.002	0.003	-0.013	-0.014	-0.013	-0.013	0.010	0.009	0.011	0.011
	(0.019)	(0.019)	(0.019)	(0.019)	(0.011)	(0.011)	(0.011)	(0.011)	(0.019)	(0.018)	(0.019)	(0.019)
Low SES	-0.019	-0.008	-0.011	-0.013	0.001	-0.003	-0.002	-0.003	0.016	0.012	0.014	0.016
	(0.032)	(0.032)	(0.032)	(0.032)	(0.018)	(0.018)	(0.018)	(0.018)	(0.029)	(0.029)	(0.029)	(0.029)
Trend	-0.013***	-0.011***	-0.013***	-0.013***	0.012***	0.013***	0.014***	0.014***	-0.004	-0.007**	-0.006*	-0.006*
	(0.004)	(0.004)	(0.004)	(0.004)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)
Trends squared	0.004***	0.004***	0.004***	0.004***	-0.002***	-0.002***	-0.003***	-0.003***	-0.001	-0.000	-0.001	-0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)
Ln (Cohort Size)	-0.332***	-0.357***	-0.356***	-0.372***	0.134***	0.119***	0.109***	0.105***	0.240***	0.280***	0.290***	0.306***
	(0.059)	(0.059)	(0.059)	(0.059)	(0.032)	(0.032)	(0.033)	(0.033)	(0.052)	(0.052)	(0.052)	(0.052)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Education Controls	No	No	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes
Neighborhood FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
School	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Field of Study FE	No	No	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes
University FE	No	No	No	Yes	No	No	No	Yes	No	No	No	Yes
Observations	479,863	479,863	474,234	474,234	479,863	479,863	474,234	474,234	479,863	479,863	474,234	474,234
R-squared	0.084	0.089	0.094	0.104	0.092	0.094	0.096	0.098	0.077	0.088	0.090	0.101

Notes: In columns [1] to [4] the outcome variable is a categorical variable equal to 1 if the student was employed 6 months after graduation; the outcome variable in columns [5] to [8] is a categorical variable equal to 1 if the student was unemployed 6 months after graduation; the outcome variable in columns [9] to [12] is a categorical variable equal to 1 if the student was pursuing further studies 6 months after graduation. The regressions refer to the 2006 reform and include data on 1st year UG students enrolled between 2004/05-2009/10. The neighborhood FE are defined using the lower layer super output are where the student was residing at age 16 (we use around 32,400 regions). The school FE are defined as the school attended by the student at age 16, when they sat the GCSEs. The controls are female and white categorical variables. The education controls are the number of full GCSE taken, the number of A* marks in GCSE, the number of A marks in GCSE, the number of B marks in GCSE, the number of C marks in GCSE and the number of D marks in GCSE. * denotes significance at the 10% level, ** denotes significance at the 5% level, and *** denotes significance at the 1% level. Robust standard errors clustered at the school enrolled (at age 16) level in parentheses.

Table 15: Contract Types

	Pr(Full time contract)				Pr(Permanent contract)				Pr(Temporary contract)			
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
2006 HE Reform	-0.016***	-0.011***	-0.012***	-0.012***	-0.002	0.003	0.003	0.003	0.002	-0.001	-0.001	-0.001
	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)	(0.006)	(0.006)	(0.006)	(0.005)	(0.006)	(0.006)	(0.006)
2006 HE Reform *Medium SES		-0.006*	-0.007*	-0.007*		-0.007	-0.005	-0.005		0.004	0.003	0.003
		(0.003)	(0.003)	(0.003)		(0.005)	(0.005)	(0.005)		(0.005)	(0.005)	(0.005)
2006 HE Reform *Low SES		-0.017***	-0.016***	-0.017***		-0.012*	-0.011	-0.012*		0.001	0.000	0.001
		(0.005)	(0.005)	(0.005)		(0.007)	(0.007)	(0.007)		(0.006)	(0.006)	(0.006)
Medium SES	-0.018	-0.014	-0.013	-0.012	-0.031	-0.027	-0.020	-0.022	0.009	0.007	-0.000	-0.001
	(0.021)	(0.021)	(0.021)	(0.020)	(0.027)	(0.027)	(0.027)	(0.027)	(0.026)	(0.026)	(0.026)	(0.026)
Low SES	-0.024	-0.018	-0.015	-0.010	-0.053	-0.042	-0.045	-0.052	0.039	0.033	0.027	0.036
	(0.032)	(0.032)	(0.032)	(0.032)	(0.045)	(0.045)	(0.045)	(0.045)	(0.043)	(0.043)	(0.044)	(0.044)
Trend	-0.024***	-0.027***	-0.028***	-0.029***	0.017***	0.021***	0.020***	0.020***	0.028***	0.024***	0.025***	0.024***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Trend Squared	0.003***	0.003***	0.003***	0.003***	-0.004***	-0.005***	-0.005***	-0.005***	-0.008***	-0.007***	-0.007***	-0.007***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Ln (Cohort Size)	-0.222***	-0.184***	-0.162**	-0.150**	-0.357***	-0.404***	-0.355***	-0.373***	-0.303***	-0.247***	-0.282***	-0.252***
	(0.063)	(0.063)	(0.063)	(0.063)	(0.079)	(0.079)	(0.079)	(0.078)	(0.075)	(0.074)	(0.075)	(0.074)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Education Controls	No	No	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes
Neighborhood FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
School	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Field of Study FE	No	No	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes
University FE	No	No	No	Yes	No	No	No	Yes	No	No	No	Yes
Observations	301,915	301,915	298,071	298,071	274,320	274,320	270,772	270,772	274,320	274,320	270,772	270,772
R-squared	0.138	0.144	0.151	0.156	0.131	0.140	0.150	0.155	0.132	0.145	0.151	0.157

Notes: The outcome variable in columns [1] to [4] is a categorical variable equal to 1 if the student was employed full time 6 months after graduation. The outcome variable in columns [5] to [8] is a categorical variable equal to 1 if the student was working with a permanent contract 6 months after graduation. The outcome variable in columns [9] to [12] is a categorical variable equal to 1 if the student was working with a temporary contract 6 months after graduation. The regressions refer to the 2006 reform and include data on 1st year UG students enrolled between 2004/05-2009/10. The neighborhood FE are defined using the lower layer super output are where the student was residing at age 16 (we use around 32,400 regions). The school FE are defined as the school attended by the student at age 16, when they sat the GCSEs. The controls are female and white categorical variables. The education controls are the number of full GCSE taken, the number of A* marks in GCSE, the number of A marks in GCSE, the number of B marks in GCSE, the number of C marks in GCSE and the number of D marks in GCSE. * denotes significance at the 10% level, ** denotes significance at the 5% level, and *** denotes significance at the 1% level. Robust standard errors clustered at the school enrolled (at age 16) level in parentheses.

Table 16: Probability to Enroll into University - 2012 Reform

	All [1]	All [2]	All [3]	All [4]	All [5]	All [6]	All [7]
2012 HE Reform	-0.034***	-0.032***	-0.035***	-0.036***	-0.050***	-0.051***	-0.051***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Ln(Cohort Size)		0.038***	0.044***	0.047***	0.077***	0.078***	0.078***
		(0.000)	(0.001)	(0.001)	(0.003)	(0.003)	(0.004)
Female				0.075***	0.013***	0.012***	0.012***
				(0.001)	(0.001)	(0.001)	(0.001)
White				-0.123***	-0.089***	-0.087***	-0.087***
				(0.001)	(0.001)	(0.001)	(0.002)
Socio-economic Index				0.022	0.102***	0.108***	0.108***
				(0.015)	(0.012)	(0.012)	(0.014)
No. A* grades at GCSEs					0.097***	0.098***	0.098***
					(0.000)	(0.000)	(0.000)
No. A grades at GCSEs					0.091***	0.092***	0.092***
					(0.000)	(0.000)	(0.000)
No. B grades at GCSEs					0.062***	0.062***	0.062***
					(0.000)	(0.000)	(0.000)
No. C grades at GCSEs					0.032***	0.032***	0.032***
					(0.000)	(0.000)	(0.000)
No. D grades at GCSEs					0.005***	0.005***	0.005***
					(0.000)	(0.000)	(0.000)
No .of full GCSE entries					-0.013***	-0.014***	-0.014***
					(0.000)	(0.000)	(0.000)
Constant	0.277***	-0.233***					
	(0.001)	(0.006)					
Neighborhood FE	No	No	Yes	Yes	Yes	Yes	Yes
School FE	No	No	No	No	No	Yes	Yes
Observations	1,544,452	1,544,452	1,544,408	1,544,403	1,544,403	1,543,735	1,543,735
R-squared	0.001	0.001	0.097	0.111	0.407	0.413	0.413

Notes: The outcome is a categorical variable equal to 1 if the student is enrolled into an English university at age 18 and 0 otherwise. The regressions refer to the 2012 reform and include data on 1st year UG students enrolled between 2011/12-2013/14. The neighborhood FE are defined using the lower layer super output are where the student was residing at age 16 (we use around 32,400 regions). The school FE are defined as the school attended by the student at age 16, when they sat the GCSEs. * denotes significance at the 10% level, ** denotes significance at the 5% level, and *** denotes significance at the 1% level. Robust standard errors in parentheses. Robust standard errors clustered at the school enrolled (at age 16) level, in parentheses in column [7].

Table 17: Probability to Enroll into University - Gaps by Socio-Economic Status - 2012 Reform

	All	All
	[1]	[2]
2012 HE Reform	-0.064***	-0.074***
	(0.002)	(0.002)
2012 HE Reform * Medium SES	0.029***	0.027***
	(0.002)	(0.002)
2012 HE Reform * Low SES	0.045***	0.042***
	(0.002)	(0.002)
Medium SES	-0.019***	-0.017***
	(0.003)	(0.003)
Low SES	-0.028***	-0.026***
	(0.004)	(0.004)
Ln(Cohort Size)	0.053***	0.078***
	(0.003)	(0.004)
Controls	Yes	Yes
Education Controls	No	Yes
Neighborhood FE	No	Yes
School FE	Yes	Yes
Observations	1,543,735	1,543,735
R-squared	0.165	0.413

Notes: The outcome is a categorical variable equal to 1 if the student is enrolled into an English university at age 18 and 0 otherwise. The regressions refer to the 2012 reform and include data on 1st year UG students enrolled between 2011/12-2013/14. The neighborhood FE are defined using the lower layer super output are where the student was residing at age 16 (we use around 32,400 regions). The school FE are defined as the school attended by the student at age 16, when they sat the GCSEs. The controls are female and white categorical variables. The education controls are the number of full GCSE taken, the number of A* marks in GCSE, the number of A marks in GCSE, the number of B marks in GCSE, the number of C marks in GCSE and the number of D marks in GCSE. * denotes significance at the 10% level, ** denotes significance at the 5% level, and *** denotes significance at the 1% level. Robust standard errors clustered at the school enrolled (at age 16) level in parentheses.

Appendix A

Table A.1.: Robustness Check - University Enrolment

	All [1]	All [2]	All [3]	All [4]	All [5]	All [6]
2006 HE Reform	0.004***	-0.016***	-0.010***	-0.003**	0.004***	-0.003***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Trend		0.007***	0.000	0.014***		
		(0.000)	(0.001)	(0.001)		
Trend Squared			0.001***	-0.008***		
			(0.000)	(0.001)		
Trend Cubic				0.001***		
				(0.000)		
Ln(Cohort Size)					0.005	
					(0.013)	
2nd Tercile of Ln(Cohort Size)						0.014***
						(0.001)
3rd Tercile of Ln(Cohort Size)						-0.000
						(0.001)
Constant	0.235***	0.232***	0.234***	0.231***	0.171	0.235***
	(0.000)	(0.000)	(0.001)	(0.001)	(0.174)	(0.000)
Observations	2,816,255	2,816,255	2,816,255	2,816,255	2,816,255	2,816,255
R-squared	0.000	0.000	0.000	0.000	0.000	0.000

Notes: The outcome is a categorical variable equal to 1 if the student is enrolled into an English university at age 18 and 0 otherwise. The regressions refer to the 2006 reform and include data on 1st year UG students enrolled between 2004/05-2009/10. * denotes significance at the 10% level, ** denotes significance at the 5% level, and *** denotes significance at the 1% level. Robust standard errors clustered at the school enrolled (at age 16) level in parentheses.

Table A.2.: Robustness Check - University Enrollment - 5 Socio-economic Categories

	All [1]	All [2]	All [3]
2006 HE Reform	-0.004***	-0.016***	-0.016***
	(0.001)	(0.002)	(0.002)
2006 HE Reform*2nd Quintile		0.007***	0.007***
		(0.002)	(0.002)
2006 HE Reform*3rd Quintile		0.012***	0.011***
		(0.002)	(0.001)
2006 HE Reform*4th Quintile		0.018***	0.017***
		(0.002)	(0.001)
2006 HE Reform*5th Quintile		0.021***	0.019***
		(0.002)	(0.002)
2nd Quintile	0.004	-0.001	-0.012*
	(0.008)	(0.009)	(0.006)
3rd Quintile	0.001	-0.007	-0.014*
	(0.011)	(0.011)	(0.008)
4th Quintile	-0.010	-0.022*	-0.027***
	(0.013)	(0.013)	(0.009)
5th Quintile	-0.011	-0.024*	-0.028***
	(0.014)	(0.014)	(0.010)
Trend	-0.012***	-0.012***	-0.013***
	(0.001)	(0.001)	(0.001)
Trend Squared	0.003***	0.003***	0.002***
	(0.000)	(0.000)	(0.000)
Ln (Cohort Size)	0.246***	0.246***	0.297***
	(0.021)	(0.021)	(0.017)
Controls	Yes	Yes	Yes
Education Controls	No	No	Yes
Neighborhood FE	Yes	Yes	Yes
School FE	Yes	Yes	Yes
Observations	2,815,542	2,815,542	2,815,531
R-squared	0.193	0.193	0.524

Notes: The outcome is a categorical variable equal to 1 if the student is enrolled into an English university at age 18 and 0 otherwise. The regressions refer to the 2006 reform and include data on 1st year UG students enrolled between 2004/05-2009/10. The neighborhood FE are defined using the lower layer super output are where the student was residing at age 16 (we use around 32,400 regions). The school FE are defined as the school attended by the student at age 16, when they sat the GCSEs. The controls are female and white categorical variables. The education controls are the number of full GCSE taken, the number of A* marks in GCSE, the number of A marks in GCSE, the number of B marks in GCSE, the number of C marks in GCSE and the number of D marks in GCSE. * denotes significance at the 10% level, ** denotes significance at the 5% level, and *** denotes significance at the 1% level. Robust standard errors clustered at the school enrolled (at age 16) level in parentheses.

Table A.3: Robustness Check - University Enrollment - Localized Effect

	All	All	All
	[1]	[2]	[3]
2006 HE Reform	-0.002**	-0.012***	-0.009***
	(0.001)	(0.002)	(0.001)
2006 HE Reform * Medium SES		0.013***	0.007***
		(0.002)	(0.002)
2006 HE Reform * Low SES		0.016***	0.010***
		(0.002)	(0.002)
Medium SES	-0.074	-0.083*	-0.081***
	(0.047)	(0.047)	(0.030)
Low SES	-0.065	-0.081	-0.061*
	(0.050)	(0.050)	(0.033)
Controls	Yes	Yes	Yes
Education Controls	No	No	Yes
Neighborhood FE	Yes	Yes	Yes
School FE	Yes	Yes	Yes
Observations	947,920	947,920	947,909
R-squared	0.221	0.221	0.549

Notes: The outcome is a categorical variable equal to 1 if the student is enrolled into an English university at age 18 and 0 otherwise. The first three regressions refer to the 2006 reform and include data on 1st year UG students enrolled between 2005/06-2006/07. The neighborhood FE are defined using the lower layer super output are where the student was residing at age 16 (we use around 32,400 regions). The school FE are defined as the school attended by the student at age 16, when they sat the GCSEs. The controls are female and white categorical variables. The education controls are the number of full GCSE taken, the number of A* marks in GCSE, the number of A marks in GCSE, the number of B marks in GCSE, the number of C marks in GCSE and the number of D marks in GCSE. * denotes significance at the 10% level, ** denotes significance at the 5% level, and *** denotes significance at the 1% level. Robust standard errors clustered at the school enrolled (at age 16) level in parentheses.

Table A.4.: Robustness Check - University Enrollment - Free School Meal

	All	All	All
	[1]	[2]	[3]
2006 HE Reform	-0.004***	-0.006***	-0.006***
	(0.001)	(0.001)	(0.001)
2006 HE Reform*FSM		0.012***	0.011***
		(0.001)	(0.001)
FSM	-0.081***	-0.089***	-0.013***
	(0.001)	(0.001)	(0.001)
Trend	-0.012***	-0.012***	-0.013***
	(0.001)	(0.001)	(0.001)
Trend Squared	0.003***	0.003***	0.002***
	(0.000)	(0.000)	(0.000)
Ln (Cohort Size)	0.245***	0.245***	0.299***
	(0.021)	(0.021)	(0.017)
Controls	Yes	Yes	Yes
Education Controls	No	No	Yes
Neighborhood FE	Yes	Yes	Yes
School FE	Yes	Yes	Yes
Observations	2,814,949	2,814,949	2,814,938
R-squared	0.196	0.196	0.524

Notes: The outcome is a categorical variable equal to 1 if the student is enrolled into an English university at age 18 and 0 otherwise. The regressions refer to the 2006 reform and include data on 1st year UG students enrolled between 2004/05-2009/10. The neighborhood FE are defined using the lower layer super output are where the student was residing at age 16 (we use around 32,400 regions). The school FE are defined as the school attended by the student at age 16, when they sat the GCSEs. The controls are female and white categorical variables. The education controls are the number of full GCSE taken, the number of A* marks in GCSE, the number of A marks in GCSE, the number of B marks in GCSE, the number of C marks in GCSE and the number of D marks in GCSE.* denotes significance at the 10% level, ** denotes significance at the 5% level, and *** denotes significance at the 1% level. Robust standard errors clustered at the school enrolled (at age 16) level in parentheses.

Table A.5.: Robustness Check - University Enrollment - No London Universities

	Pr(Enroll into Uni)			Ln(Distance btw Home and Uni)			Pr(Same Commuting Area)		
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
2006 HE Reform	-0.005***	-0.015***	-0.014***	-0.030***	-0.031***	-0.041***	0.008***	0.007***	0.009***
	(0.001)	(0.002)	(0.001)	(0.008)	(0.009)	(0.008)	(0.002)	(0.003)	(0.003)
2006 HE Reform * Medium SES		0.011***	0.009***		-0.004	0.002		0.004*	
		(0.001)	(0.001)		(0.007)	(0.007)		(0.002)	(0.002)
2006 HE Reform * Low SES		0.017***	0.016***		0.013	0.027***		-0.001	-0.003
		(0.001)	(0.001)		(0.010)	(0.009)		(0.003)	(0.003)
Medium SES	-0.007	-0.014**	-0.013**	-0.042	-0.040	-0.049	0.016	0.014	0.016
	(0.007)	(0.007)	(0.005)	(0.039)	(0.039)	(0.039)	(0.011)	(0.012)	(0.011)
Low SES	-0.010	-0.020**	-0.015**	-0.019	-0.026	-0.047	0.010	0.010	0.014
	(0.009)	(0.009)	(0.007)	(0.068)	(0.068)	(0.066)	(0.020)	(0.020)	(0.020)
Trend	-0.011***	-0.011***	-0.012***	0.010	0.010	-0.000	-0.001	-0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.008)	(0.008)	(0.008)	(0.002)	(0.002)	(0.002)
Trend Squared	0.003***	0.003***	0.002***	0.000	0.000	0.002	-0.001	-0.001	-0.001**
	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)
Ln(Cohort Size)	0.236***	0.236***	0.280***	-0.095	-0.095	0.110	-0.045	-0.045	-0.080**
	(0.021)	(0.021)	(0.017)	(0.126)	(0.126)	(0.125)	(0.037)	(0.037)	(0.037)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Education Controls	No	No	Yes	No	No	Yes	No	No	Yes
Neighborhood FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
School FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,748,397	2,748,397	2,748,386	602,691	602,691	602,691	602,691	602,691	602,691
R-squared	0.186	0.186	0.516	0.344	0.344	0.374	0.352	0.352	0.362

Notes: The outcome in the first three columns is a categorical variable equal to 1 if the student is enrolled into an English university at age 18 and 0 otherwise. The outcome in columns [4] to [6] is the geographical distance between the student's home measured at age 16 and the university enrolled in at age 18, expressed in km. The outcome in columns [7] to [9] is is a categorical variable equal to 1 if the student is enrolled into a university located in the same commuting area as their residency at age 16. The regressions refer to the 2006 reform and include data on 1st year UG students enrolled between 2004/05-2009/10. The regressions do not include any London based university. The neighborhood FE are defined using the lower layer super output are where the student was residing at age 16 (we use around 32,400 regions). The school FE are defined as the school attended by the student at age 16, when they sat the GCSEs. The controls are female and white categorical variables. The education controls are the number of full GCSE taken, the number of A* marks in GCSE, the number of A marks in GCSE, the number of B marks in GCSE, the number of C marks in GCSE and the number of D marks in GCSE. * denotes significance at the 10% level, ** denotes significance at the 5% level, and *** denotes significance at the 1% level. Robust standard errors clustered at the school enrolled (at age 16) level in parentheses.

Table A.6.: Robustness Check - Probability to Pursue a Field of Study

	Medicine		STEM		Social Sciences		Languages		Arts and Education	
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
2006 HE Reform	0.001	-0.004	0.002	0.006**	0.001	0.006*	0.001	-0.003	-0.005**	-0.005**
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.003)
2006 HE Reform * Medium SES		0.005**		-0.005**		-0.008***		0.005**		0.002
		(0.003)		(0.002)		(0.003)		(0.002)		(0.002)
2006 HE Reform * Low SES		0.013***		-0.012***		-0.007**		0.004*		0.002
		(0.003)		(0.003)		(0.003)		(0.002)		(0.003)
Medium SES	0.026*	0.023	-0.032**	-0.030**	-0.002	0.004	0.002	-0.002	0.005	0.006
	(0.016)	(0.016)	(0.013)	(0.013)	(0.016)	(0.016)	(0.012)	(0.012)	(0.014)	(0.014)
Low SES	0.054**	0.045*	-0.030	-0.027	-0.034	-0.025	0.014	0.009	-0.005	-0.003
	(0.025)	(0.026)	(0.022)	(0.022)	(0.027)	(0.027)	(0.018)	(0.018)	(0.020)	(0.020)
Trend	0.016***	0.014***	0.003	0.000	0.005	0.007**	-0.014***	-0.017***	-0.009***	-0.006**
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)
Trend Squared	-0.002***	-0.002***	-0.000	-0.000	-0.000	-0.001	0.002***	0.002***	0.001***	0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)
Ln (Cohort Size)	-0.153***	-0.125***	-0.117***	-0.085**	-0.346***	-0.383***	0.301***	0.342***	0.315***	0.251***
	(0.045)	(0.045)	(0.040)	(0.040)	(0.048)	(0.048)	(0.033)	(0.033)	(0.035)	(0.035)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Education Controls	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Neighborhood FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
School FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	669,924	669,924	669,924	669,924	669,924	669,924	669,924	669,924	669,924	669,924
R-squared	0.081	0.084	0.147	0.155	0.074	0.087	0.080	0.095	0.086	0.109

Notes: The outcome is a categorical variable equal to 1 if the student is pursuing a specific field of study 0 otherwise. The outcome in the first two columns is the probability to pursue a degree in Medicine, Dentistry or allied subjects. The outcome in columns [3] and [4] is the probability to pursue a degree in STEM. The outcome in columns [5] and [6] is the probability to pursue a degree in Social Sciences. The outcome variable in columns [7] and [8] is the probability to pursue a degree in Languages, while the outcome variable in columns [9] and [10] is the probability to pursue a degree in Arts or Education. For a detailed description of each field of study see Table C.2. in Appendix C. The regressions refer to the 2006 reform and include data on 1st year UG students enrolled between 2004/05-2009/10. The neighborhood FE are defined using the lower layer super output are where the student was residing at age 16 (we use around 32,400 regions). The school FE are defined as the school attended by the student at age 16, when they sat the GCSEs. The controls are female and white categorical variables. The education controls are the number of full GCSE taken, the number of A* marks in GCSE, the number of A marks in GCSE, the number of B marks in GCSE, the number of C marks in GCSE and the number of D marks in GCSE. * denotes significance at the 10% level, ** denotes significance at the 5% level, and *** denotes significance at the 1% level. Robust standard errors clustered at the school enrolled (at age 16) level in parentheses.

Appendix B

Table B.1.: Definition of the Eligibility for Maintenance Grants by Year and Family Income

Year	Full Maintenance Grant	Partial Maintenance Grant	No Maintenance Grant
2004	$\leq$ £15,000	£15,001-£22,500	$>$ £22,500
2005	$\leq$ £15,000	£15,001-£22,500	$>$ £22,500
2006	$\leq$ £17,500	£17,501-£37,425	$>$ £37,425
2007	$\leq$ £17,910	£17,911-£38,330	$>$ £38,330
2008	$\leq$ £25,000	£25,001-£60,005	$>$ £60,005
2009	$\leq$ £25,000	£25,001-£60,005	$>$ £60,005

Notes: The grouping is based on the information provided by The Student Loan Company (available at `http://www.slc.co.uk/official-statistics/full-catalogue-of-official-statistics/student-support-for-higher-education-in-england.aspx`) and in Dearden, Fitzsimons and Wyness (2014)

Appendix C

GCSE

For the period under analysis, the grading system of the GCSEs changed. Based on the information provided by Ofsted and Ofqual, the following scales were used in the calculation of the grades obtained in the GCSE in English and in Maths:

Table C.1.: Grading System GCSEs

Panel A:Single Awards

Grade	A*	A	B	C	D	E	F	G
Old points(before 2004)	8	7	6	5	4	3	2	1
New points(2004 onwards)	58	52	46	40	34	28	22	16

Panel B: Double Awards

Grade	A*A*	A*A	AA	AB	BB	BC	CC	CD	DD	DE	EE	EF	FF	FG	GG
New points (2008 onwards)	58	55	52	49	46	43	40	37	34	31	28	25	22	19	16

Notes: Double Award GCSE subjects are certificated on a fifteen-point scale for the first time in the June 2008 examination. For the Double Awards, the grade is recorded twice on the certificate to indicate that the results in these specifications have the same status as GCSE grades in two other single-certificate subjects. Source Ofsted, Ofqual

Undergraduate Degree Definition

The undergraduate students who represent the student population considered in this analysis are formed or two categories of students: first degree and other undergraduate degree. According to HESA, the First degree includes first degrees with or without eligibility to register to practice with a Health or Social Care or Veterinary statutory regulatory body, first degrees with qualified teacher status (QTS)/registration with the General Teaching Council (GTC), enhanced first degrees, first degrees obtained concurrently with a diploma and intercalated first degrees. Other undergraduate includes qualification aims below degree level such as Foundation Degrees, diplomas in HE with eligibility to register to practice with a Health or Social Care regulatory body, Higher National Diploma (HND), Higher National Certificate (HNC), Diploma of Higher Education (DipHE),Certificate of Higher Education (CertHE), foundation courses at HE level, NVQ/SVQ levels 4 and 5, post-degree diplomas and certificates at undergraduate level, professional qualifications at undergraduate level, other undergraduate diplomas and certificates including post registration health and social care courses, other formal HE qualifications of less than degree standard, institutional undergraduate credit and no formal undergraduate qualifications. The coding also accounts for the mapping between the old and the new codes which was introduced in 2007/08[28].

[28]Source: `https://www.hesa.ac.uk/index.php?option=com_studrec&task=show_file&mnl=07051&href=MappingQUALAIM.html`

Field of Study

In the HESA data there are 20 major field of study pursued at higher education level, but we group the fields of study in 5 groups as below in order to increase precision:

Table C.2.: Coding of Field of Study

JACS Subject Groups	**5 Subject Groups**
Medicine and Dentistry	Medicine, Dentistry and Allied Subjects
Other Medical Subjects	Medicine, Dentistry and Allied Subjects
Biological Sciences	Medicine, Dentistry and Allied Subjects
Veterinary Sciences and Agriculture	Medicine, Dentistry and Allied Subjects
Physical Sciences	STEM
Maths and Computer Sciences	STEM
Engineering	STEM
Technology	STEM
Architecture,Building and Planning	STEM
Social Sciences	Social Sciences
Law	Social Sciences
Business and Administration	Social Sciences
Mass Communication and Documentation	Languages and History
Linguistics and Classics	Languages and History
European Languages	Languages and History
Modern Languages	Languages and History
History and Philosophical Studies	Languages and History
Creative Arts and Design	Arts, Education, Other
Education	Arts, Education, Other
Combined	Arts, Education, Other