ISSN 2042-2695

CENTRE for ECONOMIC PERFORMANCE

CEP Discussion Paper No 1501

Revised February 2018
(Replaces October 2017 version)

The End of Free College in England: Implications for Quality, Enrolments and Equity

Richard Murphy
Judith Scott-Clayton
Gill Wyness

LSE THE LONDON SCHOOL OF ECONOMICS AND POLITICAL SCIENCE

E·S·R·C ECONOMIC & SOCIAL RESEARCH COUNCIL

Abstract
Despite increasing financial pressures on higher education systems throughout the world, many governments remain resolutely opposed to the introduction of tuition fees, and some countries and states where tuition fees have been long established are now reconsidering free higher education. This paper examines the consequences of charging tuition fees on university quality, enrolments, and equity. To do so, we study the English higher education system which has, in just two decades, moved from a free college system to one in which tuition fees are among the highest in the world. Our findings suggest that England's shift has resulted in increased funding per head, rising enrolments, and a narrowing of the participation gap between advantaged and disadvantaged students. In contrast to other systems with high tuition fees, the English system is distinct in that its income-contingent loan system keeps university free at the point of entry, and provides students with comparatively generous assistance for living expenses. We conclude that tuition fees, at least in the English case supported their goals of increasing quality, quantity, and equity in higher education

Keywords: higher education, financial aid, tuition fees, inequality
JEL: I22; I23; I28

This paper was produced as part of the Centre's Education and Skills Programme. The Centre for Economic Performance is financed by the Economic and Social Research Council.

We thank Nicholas Barr, Bruce Chapman, Vincent Carpentier and Lorraine Dearden for their comments and suggestions. We also thank participants of the 2017 Higher Education, Funding & Access Seminar at the University of Edinburgh, and participants of the 2016 Northwestern University economics workshop for comments and suggestions.

Richard Murphy, University of Texas at Austin, NBER and Centre for Economic Performance, London School of Economics. Judith Scott-Clayton, Teachers College, Columbia University and NBER, Gill Wyness, UCL Institute of Education and Centre for Economic Performance, London School of Economics

Published by
Centre for Economic Performance
London School of Economics and Political Science
Houghton Street
London WC2A 2AE

1. Introduction

The economic importance of higher education (HE) is well-established. Economic evidence demonstrates that education fuels economic growth and global competitiveness (Aghion et al 2009,; Valero and Van Reenen, 2016), whilst more educated societies have been shown to have higher levels of volunteering and voting (Dee, 2004), better birth outcomes and higher levels of school readiness in the next generation (Currie & Moretti, 2003) and lower levels of crime (Lochner & Moretti, 2004). Yet higher education systems across the world are becoming increasingly financially fragile (Johnstone, 2009). Demand for a college education has continued to grow – in the developing world fueled by demographic increases in the traditional college-age cohort and increasing secondary school completion rates, and in the developed world too, with rising demand for skilled labour. This increasing demand for higher education coupled with increases in per student costs (which tend to grow with the pushing out of the technological frontier) mean that for many countries, it is difficult for government to maintain funding.

Yet despite these financial pressures, many countries (France, Germany, Sweden, Scotland) have resisted the idea of financing the HE sector by drawing upon private resources through tuition fees. Meanwhile, some countries and states where tuition fees have been long established are now swinging back towards free higher education. For example, in June 2017, New York became the first US state to offer all but its wealthiest residents free tuition not only at its public community colleges, but also at public four-year institutions in the state. The new program, called the Excelsior Scholarship, doesn't make college completely free, nor is it without significant restrictions.[1] Still, the passage of this legislation demonstrates the growing strength of the free college movement in the United States. In England (the focus of this study), one of the original architects of tuition fees, Lord Adonis, recently called for their abolition (Adams, 2017), whilst the main opposition party's popular manifesto pledges to abolish fees, highlighting that the issue of who should pay for higher education is still very much a live one.

The free college movement is typically motivated by concerns about inequality in higher education access and falling enrolments. Fees are seen as a financial barrier which would particularly exclude young people from disadvantaged backgrounds. For example, the Scottish government routinely argue that higher education should be "based on the ability to learn not on the ability to pay." (SNP, 2016) whilst Bernie Sanders's campaigned pledged that "every American who studies hard in school can go to college regardless of how much money their parents make". Yet, concerns over enrolment and equity are also a key element of the arguments of those in favour of fees; Lord Adonis originally argued that with money raised

[1] Students still have to pay mandatory fees ranging from 10 to 25 percent of the tuition bill, and still have to cover textbooks and other necessary supplies. Part time students are completely excluded, as are many full-time students (students must complete at least 30 credits per year to renew, more than the 24 credits required for full-time status), and students must live in-state for a specified period after leaving school or else the scholarship is converted to a loan.

from tuition fees, "concerns about access for poorer students could be met, while providing a vital new source of income for the universities." (Adams, 2017).

Given the increasing financial pressure on HE systems throughout the world, which of these two courses of action would achieve the goals of increased enrollment, access and quality? Is it possible to charge relatively high rates of tuition fees and also protect (and even improve) the goals, or do they stand in the way of these three goals? In this paper we examine this question, in the context of the English HE system which has, in just two decades, moved from a no fees, low aid college system to one in which tuition fees are among the highest in the world.[2]

We particularly consider these three outcomes since, in designing higher education finance policy, there is widespread agreement on policy objectives (Barr, 2013)[3]: i) facilitating student enrolment (thus promoting human capital accumulation and economic growth, as well as other societal benefits associated with a more educated population); ii) protecting access of under-represented groups for equity and efficiency reasons, and iii) maintaining quality in the sector through adequate per-head investment. Yet, as described, there is far less consensus on how to achieve these goals, and debate over the role of tuition fees is politically charged.

England is an appropriate setting for this research. Until 1998, domestic full-time students in England could attend public universities completely free of charge. But concerns about declining quality at public institutions, government mandated caps on enrolment, and sharply rising inequality in college attainment led to a package of reforms which began in 1998, including the introduction of tuition fees. Whilst initially modest, these reforms paved the way for much more dramatic changes in the financing of HE in England; just two decades later, most public universities in England now charge £9,250 – equivalent to about $11,380, or 18% more than the average sticker price of a U.S. public four-year institution. The typical English bachelor's degree recipient is now expected to graduate with around £44,000 (approximately $54,918) in student loan debt, more than twice the average debt of graduates from even the most selective US institutions.

Our study makes an academic contribution towards the understanding of these policy changes. Whilst previous studies have examined the reforms in relation to specific dimensions such as inequality (Blanden & Machin, 2013) or the fiscal implications (Dearden et al, 2008), or causally examined one particular element of a single reform, e.g. maintenance grant changes (Dearden et al, 2014) or bursaries (Murphy & Wyness, 2015), ours is the first to systematically document how the totality changes since 1998 affected student numbers, participation specific student groups, taxpayer spending and university resources. This

[2] Note that while the US vocabulary draws a distinction between "tuition" and "fees," the common U.K. term is simply "fees" as there is little discussion nationally regarding other costs e.g. housing or books. In this paper we use the terms tuition, fees, and tuition fees interchangeably.

[3] These were the stated goals of the Labour government at the time of the original reforms (Blair, 1997)

broad view—which is primarily descriptive in nature—which we link back to basic economic tenets provides a valuable complement to more narrow causal analyses. Because the package of reforms built upon each other by design, attempting to estimate the causal impact of one policy in isolation, holding all else constant, could lead to misleading conclusions and provide an incomplete picture of whether the reforms as a whole achieved what they originally set out to do.

We illustrate that England's reforms shifted the costs of higher education away from the taxpayer and towards graduates themselves, with universities and students the key financial beneficiaries. While it is impossible to know for certain what would have happened in the absence of the reforms, our analysis shows that at minimum enrolments have continued to rise despite these dramatic shifts in how the system is financed. Moreover, after many years of widening inequality, socioeconomic gaps in college participation appear to have stabilized in the years since the initial reform. Looking at our third dimension – university quality – we show that tuition fees have played a crucial role in protecting investment in the sector. Per-student expenditures, having fallen to an historic low in the years pre-reform, have fully recovered since the introduction of tuition fees.

Our study suggests that there are several key features of the English system that have helped moderate the impact of rising tuition on enrolments and access, including: 1) deferring all tuition fees until after graduation so that no student pays anything up-front; 2) increasing liquidity available to students to cover living expenses; and 3) automatically enrolling all graduates in an income-contingent loan repayment system that minimizes both administrative burden and the risk of default. Our findings also confirm that drawing on private resources can hugely alleviate the challenge of insufficient resources that is present in free HE systems.

The rest of the paper is set out as follows. Section 2 documents the situation in the UK prior to the reforms, the debate surrounding them and then the details of the successive reforms since 1998. Section 3 describes our empirical approach and data sources. Section 4 examines the empirical incidence of these policy changes over time: who pays and who benefits. Section 5 evaluates how these policy changes in relation to the three policy goals of, enrolment, access and quality using a range of administrative data sources. Finally Section 6 concludes with a discussion of policy implications.

2. Policy context

2.1. Challenges during England's free college era

The English system of postsecondary education comprises universities offering traditional BA and BSc degrees (which typically require three years of full-time study) as well as postgraduate degrees, and "further

education" colleges, many of which can also offer higher education degrees[4], but which predominantly offer shorter vocational and professional credentials. While the system includes a handful of private institutions[5], nearly all higher education enrolment takes place via the publicly-funded system[6].

Prior to 1998, public universities in England were fully funded by local education agencies and the national government such that higher education was completely tuition-free for full-time domestic students.[7] To help cover living expenses while enrolled, low-income students could apply to the government for maintenance grants, and all students could obtain small government maintenance loans to be repaid via mortgage-style payment plans after graduation (Dearden et al, 2014).

In the 25 years from 1961 to 1986 the total (full time equivalent) student enrolment increased by 387k, but in the decade from 1986 enrolment increased by 770k students, or 124 percent. The reasons for this rapid increase are both demand and supply driven. The proportion of students staying on at school increased substantially, most likely as a consequence of the introduction of the General Certificate of Secondary Education (GCSE) in 1988 which led to improved exam results, and in turn to a larger pool of students eligible for university (see Blanden et al. 2005). As well as this, demand for education grew as students responded to sharp increases in the economic returns to college during the late 1980s and 1990s fueled by demand for skilled labour (Blanden and Machin, 2004). Government intervention was also partly responsible for the expansion, as changes to the way universities were funded increased the incentives for them to expand. This was compounded by a significant policy change in the early 1990s when polytechnics were put under the same funding arrangements as universities, meaning they could became independent universities and award their own degrees (Williams, 1997).[8]

These large increases in enrollment put England's free higher education system under strain. Government funding failed to keep up, and institutional resources per full-time equivalent student declined by over 39 percent in real terms in the decade from 1986.[9] In response, in 1994, the government imposed

[4] Much of the HE provision in FE colleges is vocationally oriented (e.g. degrees in subjects such as construction, or mechanical engineering) though the lines are growing increasingly blurred. See AoC (2012) for more details of these. Note also that degrees obtained at FE colleges are subject to the same fee caps as those obtained in universities.

[5] At the time of writing there were 5 fully private universities in the UK (the University of Buckingham, BPP University, Regent's University London, the University of Law and Arden University).

[6] Since the early 2000s, universities have been classified all together to the 'non-profit institutions serving households' (S.15) sector in the UK National Accounts. This classification predates the 2012 rise in tuition fees and other changes in funding arrangements.

[7] While the English system includes a handful of private institutions, nearly all university enrollment takes place via the public system. Even during this "free college" era there was a concept of tuition fees, but they were paid by local education agencies directly to the national government and largely invisible to students (Dolton & Lin 2011).

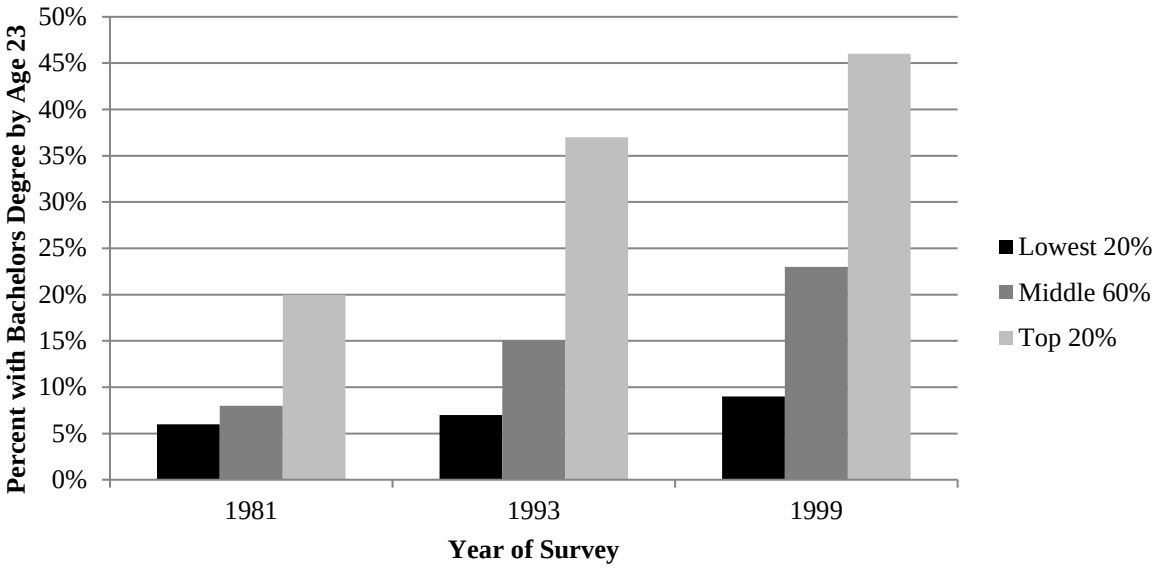
[8] Students attending polytechnics could study towards bachelors, masters, and PhD level qualifications. These students were eligible for the same funding, and applied for places through the same system (UCAS). The key difference was that the awarding of qualifications was done by a quasi-governmental agency, to ensure high standards. As such polytechnics were seen as lower ranked, performed less research, had lower entry requirements and concentrated on applied sciences and engineering.

[9] All currency amounts are converted to 2015 equivalents using data from Carpentier (2004).

explicit limits on the numbers of state-supported students each university could enroll.[10] Despite these controls, per-student resources continued to fall throughout the 1990s. By 1998, funding had fallen to a new low of £7,054 per student, barely half the level of per-student investment that the system had provided in 1973.

As well as the strain on resources, the sector was also not meeting England's other desired goal of access. Despite the fact that college was tuition-free and enrolments were increasing overall, the expansion of HE did not benefit all young people equally. Blanden and Machin (2004; 2013) study the gap in degree attainment between high and low income families over the time period of the expansion in HE, and show that those from rich families benefitted disproportionately from the expansion. As Figure 1 illustrates, the gap in degree attainment between high- and low-income families more than doubled during this period, from a 14 percentage point gap in college attainment among those aged 23 1981, to a 37 percentage point gap for those aged 23 in 1999. Their study also shows that family income displayed a closer association with degree attainment among those graduating in the later years of the expansion. This strengthening of education-income relations has clear implications for intergenerational mobility, given the returns to degrees.

Figure 1: Percent with BA/BSc Degree by Age 23, by Family Income



Source: Blanden & Machin (2013), based on national longitudinal cohort surveys.[11]

[10] Each university was set a Maximum Allowable Student Number (MASN), this was replaced by limits on maximum teaching funding which effectively performed the same function in 2002. In 2012 the funding controls were again replaced by Student Number Controls. All schemes were enforced with punishments, including fines if universities exceeded their limit.

[11] The cohort turning 23 in 1999 was minimally affected by the 1998 reforms, as most of English students graduate by age 22.

Whilst we cannot specifically attribute this rise in inequality over the period to the fall in funding per student that took place over the same period, it is clear that of the limited university places available to students, meant that the free college tuition subsidy was increasingly going to those from the richest backgrounds, who are typically the best qualified and therefore the most likely to gain a university place under competition (Chowdry et al, 2013). Moreover, the financial crisis in HE had also put a strain on student aid spending; up-front support available to students from disadvantaged backgrounds in the form of maintenance grants had been gradually eroded over the period, falling from around £4,000 per year for the most disadvantaged students in 1991 to just over £1,000 per year by 1997.[12] As many studies have shown (e.g. Dynarksi, 2003; Dearden et al, 2014) maintenance grants tend to have a positive impact on participation, suggesting the reduction in aid to the poorest students is likely to have increased inequality. Again, this is evidence that lack of funding available during the free college system hit poorest students the hardest.

2.2. The 1998 reform: progressive economic arguments for introducing tuition

It was against this backdrop that the National Committee of Inquiry into Higher Education released the Dearing Report in 1997, which called for new tuition fees supported by an expanded and revised system of student loans (Dearing 1997). It should come as no surprise that the idea of shifting costs from taxpayers to students would appeal to conservative lawmakers concerned about public expenditures. But some progressive policymakers – primarily concerned with caps on enrolment, declining quality, and rising inequality – also made the case against keeping college completely free (Blair 1997).[13]

The progressive argument for introducing fees and expanding loans had several components. First, as evidenced above, complete reliance on public funding meant universities were under constant pressure to limit enrolments, reduce per-student expenditures, or both. Note the higher-achieving students (invariably from the richest backgrounds), and more elite institutions with external funding sources, were most insulated from these consequences (Barr & Crawford, 1998).

Meanwhile, because of substantial inequality in pre-college achievement described previously, the main beneficiaries of free college were students from middle- and upper-class families – who, on average,

[12] Statistics compiled by the authors from Student Loans Company and the Office for National Statistics

[13] An extract from Tony Blair's speech at the 1997 Labour Party Conference underlines this sentiment coming from the progressive base. "Universities in Britain had their funding cut by 40 per cent per student under the Tories the science and research base - once the envy of the world - under threat. The Tories put a cap on student numbers. Only 30 per cent of youngsters in Britain admitted to university fewer not just than France or the USA, but fewer than South Korea. The hard choice: stay as we are and decline, or modernise and win. Under our proposals no parent will have to pay more. Low income families will be exempt from tuition fees. All students will repay only as they can afford to. We will lift the cap on student numbers and set a target for an extra 500,000 people into higher and further education by 2002. Our education system a beacon to the world."

would go on to reap substantial private returns from their publicly-funded college degrees (Barr, 2010). Examining this empirically, Mishkin and Straub (2014) calculate the net subsidy received by individuals across the income distribution in the pre-reform period (1994-1997), which they calculate as the difference between the gross subsidy received (tuition subsidy plus earnings premium) and the net present value of lifetime taxes paid towards higher education. Their analysis shows that net benefits follow a broadly regressive pattern: individuals from the lowest three income deciles received negative average net subsidies, while the upper seven deciles were overall net beneficiaries of the free higher education system, with the eighth and ninth deciles, receiving the largest net subsidies in absolute terms. They also point out that in the free college era, 97 per cent of those with degrees receive positive net benefits; "in other words, the gross subsidy received by graduates is so large that only the highest-earning graduates will pay as much in taxes towards higher education as they received in benefits as students."

The final component of the progressives' argument for tuition fees was that liquidity remained a major barrier for low-income students: many still struggled to afford necessary expenses for food, housing, books, and transportation (Barr & Crawford, 1998). Yet prioritizing free tuition for all students left little room in the budget to provide additional supports for low-income students.

By charging tuition, progressives argued that the system could bring in more resources from students who could afford to pay, while enabling any given level of public subsidies to go further by targeting assistance to the neediest, including efforts to reduce pre-college disparities in achievement by investing more in primary and secondary schools.

The economic rationale for soliciting some level of fee contribution from individuals is well established. To the extent that positive externalities are associated with higher levels of education (growth, health, lower crime) society should contribute to the cost of education, otherwise self-interested rational individuals would underinvest in education. However, the individual also experiences high private returns to education (wages, health, assortative matching) and therefore should contribute their appropriate share.

Despite this simple solution, the core underlying problem is how to go about charging students for their education (Friedman, 1955). Because education is an investment individuals will optimally want to invest in it at the beginning of their lifecycle, but this is also the time in which they are at their most capital constrained. Freidman sets out the two fundamental problems with the market students face when attempting to obtain credit to cover tuition fees. First, human capital is non-collateralizable; whilst lenders are willing to issue mortgages against physical properties, they are not willing to loan money for individuals to acquire knowledge, since they cannot recover anything in the case of default. Second, there is asymmetric information in that potential students are informed about their abilities and aspirations for a high earning career, but lenders are not. Both of these factors make lenders unwilling to provide loans for education (at least at affordable interest rates), so the private market for student loans would not likely form. Moreover,

borrowers also experience risk and uncertainty, since they cannot easily know what a college education entails before they undertake it, and have no guarantee of high future earnings. Individuals that are risk averse will thus choose to enter higher into higher education at lower rates.

All of these factors complicate any discussion relating to the use of tuition fees, as they will exacerbate the need for credit. The initial solution adopted by the English government to begin in 1998 (described in detail below) overcame these problems by charging low rates of up-front fees, which would only apply to the highest income (and thus least credit constrained) students. Further, a new income-contingent maintenance loan system would enable students to safely tap into their future expected earnings so they could more easily afford the full cost of attendance, including basic costs of living while enrolled (Chapman, 1997). This could be seen as the equivalent of price discrimination that occurs in many private US higher educational institutions. With a set fee advertised (sticker price), but low income students/graduates ultimately paying a lower price.

Progressives hoped that the proposed reforms would improve quality, allow for higher levels of enrolment, and reduce educational inequity. Critics, however, feared that the modest initial £1,000 fee was just the proverbial camel's nose under the tent: that fees would inevitably rise and public funding would inevitably fall, ultimately undermining progressive goals.

2.3. Twenty years of policy changes

From the student perspective, what were the practical effects of the reforms? In at least one sense, the worriers were right: the 1998 reform fundamentally changed the structure of English higher education finance, and the numerous subsequent reforms it enabled in tuition and financial aid policy have led to an entirely new landscape for new students to navigate. As we will describe, there have been many changes to the system, however there were three major sets of reforms in which the biggest changes took place. These are:

1998 reforms: The introduction of tuition fees paid by the student. The fees of up to £1,000 per year were to be paid up-front, but means-tested such that low-income students would still face no tuition fees. At the same time, the government replaced the old "mortgage style" maintenance loans (so-called as they were repaid at a set fee of, say, £50 per month), with a new income-contingent loan (ICL) system that enabled all students to access significantly more funds for living costs while enrolled. This loan was to be repaid upon graduation, but only for those working and earning over £10,000 per year. The loan was interest free in real terms, and to be repaid at 9% of the additional income over £10,000 per year.[14]

[14] For an overview of how the English ICL system and how it compares with the US student loan system see Barr et. al. 2017)

2006 reforms: In 2006, tuition fees rose to £3,000 per year. Though the major change was that these fees were no longer charged "up-front" but were automatically covered for all students via an expansion of the income-contingent loan described above. Means tested maintenance grants were also increased to £2,700 per year. This new system was arguably more in line with the economic thinking of Friedman described above. Having no upfront fee costs for any student, as well as provision of maintenance grants/loans removes the need for a private market for credit. Moreover the income contingent aspect of the loans means that the state is bearing the risk of default and so high ability risk averse students would not be put off.

2012 reforms: In 2012, tuition fees rose again, this time to £9,000 per year. The loans were still income contingent, but the threshold for repayment rose to £21,000 per year, and a positive real interest rate was applied, to vary between 0% for those earning less than £21,000 per year, and 3% for those earning over £40,000 per year. A further important element of the 2012 reforms was that government funding to universities (known as the "teaching grant") was cut dramatically, such that lecture based subjects (social sciences, humanities) were receiving no government subsidies for teaching students. With the reduction in the teaching grant the government began relaxing their direct control over student numbers. From 2012 universities could enroll unlimited students achieving at least AAB A-level grades or equivalent. From 2013 this was extended to students with at least ABB, the overall cap was increased by 30k in 2014 and in 2015 the last controls on domestic student numbers were removed.

Table 1 provides a timeline of key aspects of the 1998 and subsequent reforms, including other major changes to the student aid and loan system.

Table 1: Key features of English postsecondary finance over time

Pre-1998	- No tuition fees for full-time domestic students. - Means-tested "maintenance" grants up to £2,000 per year for living expenses - Zero real interest rate maintenance loans up to £2,000, to be repaid in 60 monthly installments
1998-99	**- Means-tested upfront tuition fee introduced, up to £1,000 per year** **- Loans were expanded for all income levels (with more for low-income) and mortgage-style repayment system replaced with income-contingent repayment system**
1999-00	- Means tested maintenance grants eliminated
2004-05	- Means tested maintenance grants up to £1,000 reintroduced
2006-07	**- Tuition fee increased to £3,000 and means-testing removed, but fee not charged up-front; all students pay after graduation via income contingent loan system** **- Means tested maintenance grants increased up to £2,700** **- Universities instructed to use at least 10% of fee revenue for additional grants (bursaries) for low-income students**
2008-09, 2009-10	- Expansion of maintenance grants & loans to middle- and higher-income students - Means-tested maintenance grants increased up to £2,900

2011-12	- Means-tested maintenance grants increased to £3,250
2012-13	**- Maximum tuition fee raised to £9,000, with maximum in subsequent years to increase with inflation** **- Maximum allowable student numbers (enrolment caps) to be phased out with complete elimination by 2015-16** **- Loan repayment threshold raised to £21,000 per year, indexed to wages** **- Interest rate on income contingent loans set at maximum of Retail Price Index (RPI) plus 3% for graduates earning above £41,000 per year (and tapered to RPI for graduates earning £21,000 per year); payments stop when balance is paid, or after 30 years, whichever comes first.**
2016-17	- Maintenance grants (with a maximum value of £3,387) for students with parental income of £25,000 or less abolished to be replaced with commensurate amount in maintenance loans - Tuition fee cap raised to £9,250 per year in 2017

Source: Students Loans Company (2012), Smith (2004).

3. Methodology

3.1. Empirical approach

We are interested in the consequences of moving from a zero-fee, low aid higher education system (such as that in place in the UK in 1997) to a high-fee, high-aid system, on i) HE enrolments, ii) access to HE and iii) institutional quality.

Rigorously assessing the causal impacts of the 1998 and subsequent reforms is not straightforward due to the widespread, drawn out, and multifaceted nature of the changes. The available causal evidence does suggest that students in England are responsive to prices, holding all else constant, just as they are in the US. Dearden et. al. (2014) look at the effect of reinstating means-tested grants in 2004, using a difference-in-difference strategy that compares enrolment before and after the 2004 reinstatement (during a period when tuition fees and loan limits were stable), for students from low- and high-income families. They estimate a positive effect on enrolment rates for low-income 18-19 year olds, on the order of 4 percentage points for a £1,000 grant. This is remarkably similar to price elasticities of demand estimates found in the US (see Deming and Dynarski (2010) for a review).

But a critical aspect of the argument for introducing fees was that all else would not be held constant. Our goal here is to take a step back to examine the broad arc of the new system's consequences over time, in a purely descriptive way.

As such, our approach involves constructing appropriate measures of enrolments, access and quality, and tracking them over the time period pre and post tuition fees. In the case of enrolment and access, this is a similar methodological approach to that used by Bailey and Dynarski (2011) in their descriptive analysis of college enrolment trends in the US. As Loeb et al (2015) note, such "comparative research is essential

for understanding the world" but suffers from two common challenges: that constructs of interest are not always comparable over time (e.g. the definition of a disadvantaged student may change over time as the standard of living increases) and that data are not always collected in the same way from one year to the next. We overcome these potential challenges by using a combination of data from different sources which are comparative over time (e.g. percentiles of the income distribution) and creating constructs which can be validly compared across time.

We define HE enrolments as the share of individuals from different age cohorts (19-20 year olds, 21-23 year olds, and 24-27 year olds) enrolling in full-time undergraduate higher education courses over time. We also study data on part-time students.

When examining access to HE, our second outcome of interest, we focus on enrolment of 19-20 year olds from different income groups; the bottom 20%, the middle 40%, and the top 20% of the household income distribution, again examining how enrolment among these groups changes over time. We also examine data on entry rates of 18 year olds, split by area geographically-based measure of advantage. In an alternative measure of access, we examine changes in the entry tariff scores of students enrolling in HE. This can be thought of as a measure of selectivity of institutions.

Our key measure of university quality (the third metric of interest) is "funding per student". We construct a consistent measure ourselves using data from the Higher Education Statistical Agency (HESA) on the total amount of funding per university, where funding includes government teaching grants and tuition fees, which we divide by the total number of students (adjusted for FTE) at each institution in the same time period.

Again, Loeb et al note that "Good descriptive research relies primarily on low-inference, low assumption methods that use no or minimal statistical adjustments." In line with this, our approach mostly relies on graphical presentation of the means of our constructed measures, over time and across groups.

3.2. Data sources

Our key data source for our measures of HE enrolment and access is the Labour Force Survey (LFS). The LFS is particularly useful for conducting research into higher education enrolment. Since 1992 it has followed approximately 60,000 households every quarter, with information on individuals' higher education participation and household income. A limitation of LFS is that sample sizes are limited compared with administrative data. However, with approximately 2000 18-19 year olds per year, from 1992 to 2016 we have adequate sample sizes for our purposes.

In addition to this data we use historical administrative data from the HESA. This contains information on students and the finance of UK higher education institutions, collected annually since 1961. HESA data is aggregated at institution / year level, but is highly detailed and accurate. Therefore we have total enrollment from 1961 to 2014. However, HESA financial records only began in 2002 so to calculate

our measure prior to this year we augment our analysis with a consistent historical time series data collected by Carpentier (2004). Ultimately we have funding per head from 1961 to 2014. Finally the HESA data also includes information on the qualifications of the entering cohorts. There is a consistent measure of this from 2007 to 2016, which covers the period in which the caps on student numbers were relaxed.

We augment these measures with statistics collated from official bodies such as the Universities and Colleges Admissions Service (UCAS), the Student Loans Company and the Higher Education Funding Council (HEFCE) as well as from research conducted by the Institute for Fiscal Studies. Some of the figures represent funding and fees set out in the legislation and therefore the data was taken directly from the appropriate statute.

4. Incidence of the reforms: who pays, and who benefits?

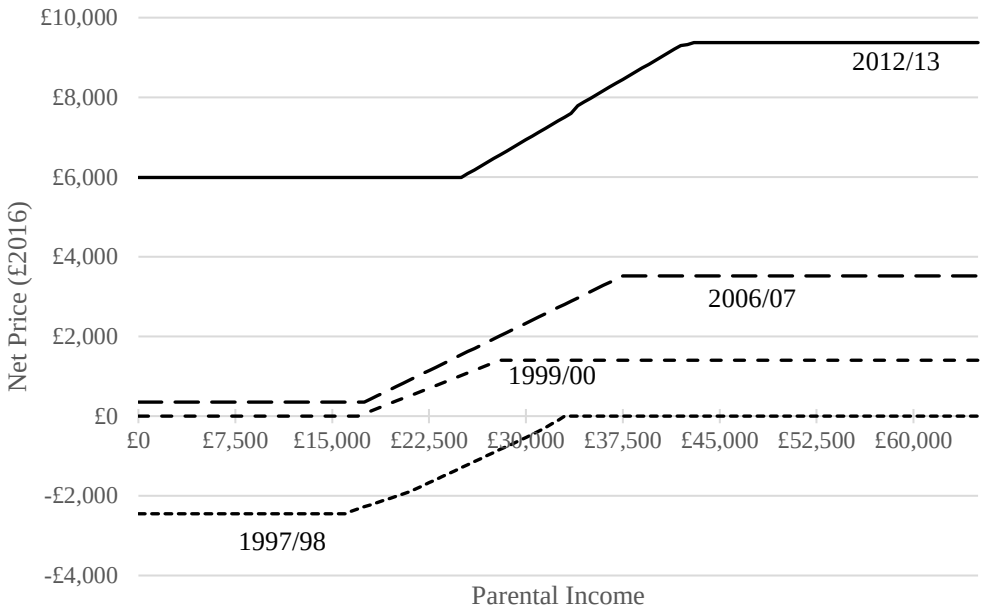
We can summarize the practical effects of these three sets of reforms – the initial introduction of fees in 1998, and their increases in 2006 and 2012 – for students along two key dimensions: first, how did the *net price* of university (tuition minus grant aid) change over time for students at different income levels? (Note this ignores student loans of any type). Second, how did *net liquidity* (grants, plus maintenance loans, minus any upfront fees) the money available to students when studying change over time, by family income?[15] This is presented for each of the four main fee regimes; 1) 1997/98 "pre fees"; 2) 1999/00 "£1000 upfront fees"; 3) 2006/7 "£3000 deferred fees"; and 4) 2012/13 "£9000 deferred fees".

Figure 2 plots net price against family income for each different fee regime.[16] All of them have a positive gradient at some point in the schedule showing that in terms of net costs they are all generally progressive. The lowest line is the 1997/98 net costs and shows that under a no fee system all students up to £33k faced a negative cost due to being eligible for maintenance grants. Those from higher family incomes also faced no fee, but received no grants, so had a net zero cost of attendance. The second lowest line is for 1999/00 and shows the net cost increased for all groups due to the introduction of £1,000 fees. Here, families of incomes of £17k or less faced zero net costs; the fee was means-tested meaning they were excluded from paying it, but at the same time grants were abolished, meaning these students faced the largest growth in net costs of any income group. The increase in fees to £3k (2006/07 regime) impacted low income students the least as even though they became eligible for the full fee, it was mostly matched with an increase in the maintenance grant (which was re-introduced in 2004). The most recent change (2012 regime) has all

[15] Maintenance loans, in English vocabulary, refer to the loans students can obtain to cover living expenses. Fee loans cover the tuition fee so that students do not have to pay any fees upfront. An alternative way to define net liquidity, which would result in the same number, would be: grants plus maintenance loans plus fee loans, minus all fees.
[16] Note the median disposable family income per year in 2009/10 was £25,418 (ONS, 2016)

students facing high net costs, with even the poorest students having a net cost of £6k (an increase in fees to £9k from £3k).

Figure 2: Net Price (Fees-Grants) by Parental Income and Fee Regime



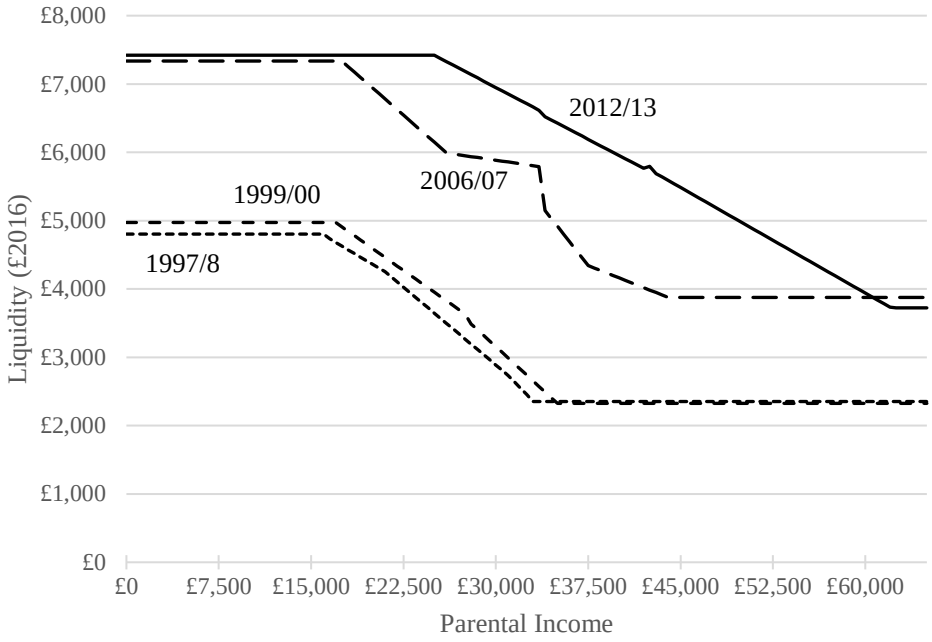
Source: Authors' calculations using data from Student Loans Company, 1991-2015.

It is important to consider that these net costs are not always paid upfront. From 2006 tuition fees were paid for with an income contingent loan. Moreover, Figure 2 does not reflect the amount of money that students had available to them from the government, as some type of maintenance loan was available to all students in all time periods. Figure 3 captures this, showing net liquidity, the sum of eligible grants and maintenance loans minus upfront fees. We can see that all students in all periods faced (and still face) positive liquidity when enrolled in college. This is in stark contrast to the situation for many students in the US where the federal financial aid available typically does not cover the cost of tuition fees, meaning many students face a negative liquidity.

As figure 3 shows, as well as the continuous rises in fees, all groups have also experienced an increase in liquidity over time. The introduction of fees in 1998 had little impact on liquidity as they were matched by increases in maintenance loans. The 2006/07 fee increases were accompanied by sharp increases in loans and grants, resulting a substantial increase in liquidity for the lowest income group -from £5k to £7.4k per year. But this reform benefited those from lower-middle income families (£33k) the most, increasing their cash in hand by £3.4k. The most recent reform had little benefit in terms of liquidity for anyone under £18k,

but it is notable that liquidity for individuals up to parental incomes above that, to as much as £60k per year increased

Figure 3: Net Liquidity (Grants+ Maintenance Loans-Up Front Fees) by Parental Income and Fee Regime



Source: Authors' calculations using data from Student Loans Company, 1991-2015.

These figures provide three insights. First, they confirm that the modest effects of the initial 1998 reform paved the way for two subsequent, major sets of reforms in 2006 and 2012. Second, the reforms increased students' liquidity – the amount of cash they could receive to support living expenses while enrolled – almost as dramatically as they increased tuition fees. Third, the progressivity of the pricing structure has not changed much in the years since the initial reform; low-income students have always paid less, but prices and liquidity have risen similarly across income groups.[17]

Of course, as well as changing prices and liquidity faced by students, the reforms also increased student debt. Before documenting how student debt levels changed as a result of the reforms, it is important to describe in a bit more detail the current nature of the student loan in England, since its design has huge implications for graduate debt and repayments. The first main feature of the loan is that it covers the entire of the students' fee obligation as well as money for maintenance. The second feature is that repayment is

[17] Note, that these charts do not include institutional need-based grants, referred to as "bursaries" in the English system, which institutions were expected to expand using their new tuition revenues, nor do they reflect changes in loan repayments among graduates, which have become more progressive under the ICL system.

calculated based on the borrowers' current earnings as a graduate, being 9% of income over a threshold – which was set at £15,000 in 2006, and increased to £21,000 in 2012.[18] The third feature is that the loan is eventually written off (after 25 years in 2006, after 30 for those taking their loans in 2012 and beyond). And a final feature of note is that, in 2012, a positive real interest rate was added to loans in 2012.

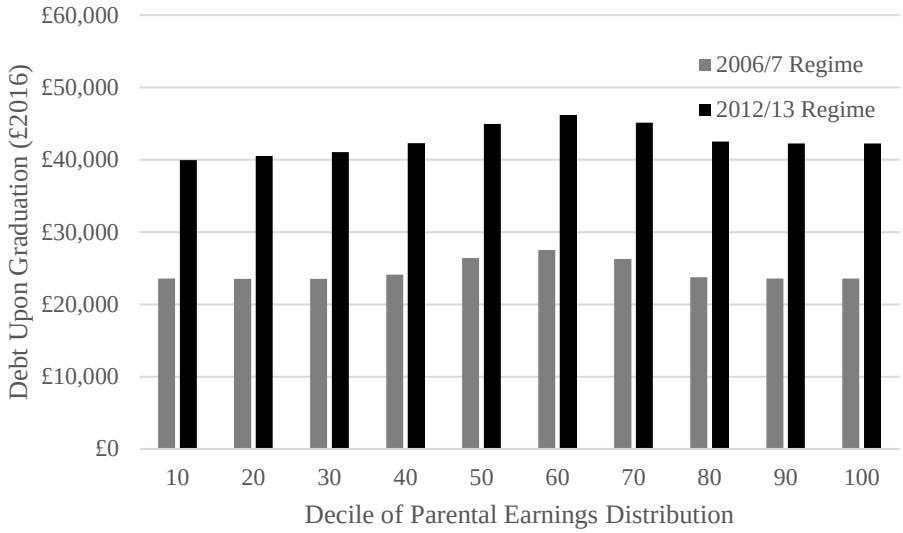
The result of this income contingency is that student debt is purely notional; what every student eventually repays need not bear much relation to their total debt. In fact graduates who have borrowed very similar amounts can have completely different repayment profiles dependent on their later earnings (and actually, due to income contingency, every single graduate has a completely different repayment profile).

Figure 4 summarizes students' debt and repayment levels for the 2006 and 2012 systems. As can be seen from Panel A, debt levels increased considerably from 2006 to 2012 for all graduates as a result of the fee increase, with the average debt level rising from around £25k to £42k. However we can see that for graduates in the lower half of the earnings distribution, *lifetime repayments* actually fell (Panel B). This is largely because the earnings threshold at which students must repay their debts increased to £21,000 per year in 2012 (from £15,000), protecting low earning graduates. Meanwhile, at the top of the distribution, repayments significantly increased, and some 2012 graduates actually repay more than their debts, due to the positive real interest rate on loans that was introduced that year. Hence, despite the large increase in fees in 2012, the system actually became more progressive in the sense that poorer graduates repay much less in 2012 than they would have had to in 2006 (due to the increase in repayment threshold), and because higher earning graduates pay much more than lower earning graduates. Some of this progressivity comes at a cost to the taxpayer, since government pays student fees direct to the university then recoups the repayments themselves. Hence the government subsidizes the net of loan repayments that remains unpaid (including unpaid interest).

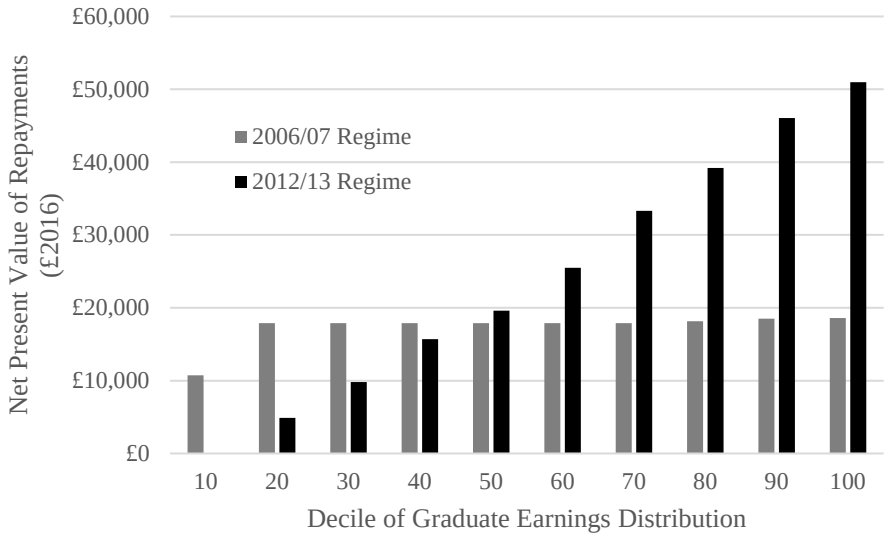
[18] Unlike the US students do not need to complete paperwork to arrange loan payments. The correct amount automatically taken out of wages by the Student Loans Company as if it was a PAYE tax.

Figure 4: Impact of Regimes on Debt and Repayments

Panel A: Debt Upon Graduation by Deciles of Parental Income



Panel B: Net Present Value of Repayments by Deciles of Graduate Income



Authors Calculations based on Dearden et al, 2008; Chowdry et al, 2012; Britton et al, 2017. Notes: Debt includes fee and maintenance loans for a three year course, NPV repayments are calculated based on simulated graduate earnings and debt levels, and repayment rules, again based on fee and maintenance loan debts incurred for a three year degree.

To get a broader sense of who pays and who benefits under England's changing models of higher education finance Table 2 further summarizes the winners and losers for each wave. It describes the net position of the reforms from the point of view of the 4 stakeholders – taxpayers (who pay into the system

through funding universities with money called "teaching grants", and through subsidizing income contingent loans), graduates (who also pay into the system through repayment of tuition fee and maintenance loans), universities (who are net beneficiaries, receiving tuition fees from graduates and teaching money from the government), and students (also net beneficiaries, receiving maintenance grants and maintenance loan money).

Table 2: Total Annual Funding Flows (£billion, 2016)

	1997-98	2003-04	2008-09	2011-12	2012-13	2017-18
Funding sources:						
Taxpayers	3.9	7.2	8.7	9.1	8.0	6.3
Graduates	0.2	0.8	1.4	6.3	11.0	12.2
Funding recipients:						
Universities	3.4	7.2	8.7	7.7	11.2	10.7
Students	0.7	0.6	1.4	7.8	7.9	7.9

Source: 1997-98 figures are authors' calculations using data from Belfield et al. (2017). 2003-04 and 2008-09 figures are taken directly from Dearden et al. (2008). 2011-12, 2012-13 and 2017-18 figures are based upon per-student figures from Belfield et al. (2017), converted to total amounts using their estimated cohort sizes. All figures expressed in constant 2016 pounds sterling.

As Table 2 shows, the total resources flowing into higher education (from the taxpayer and from graduates) has increased dramatically since 1998, with graduates themselves now expected to shoulder two thirds of the cost of their education through tuition fees (£12.2 billion versus £6.3 billion in taxpayer support). Indeed, as graduate contributions have increased since 2012, taxpayer contributions have fallen. This is because taxpayer money going direct to universities through the teaching budget was cut dramatically in 2012, so that the majority of the taxpayer contribution now comes through subsidizing income contingent loans, as previously described. It is notable that the taxpayer contribution has continued to fall beyond 2012, as the actual cost of government borrowing has been low, and college graduates continue to earn high returns in the labor market even as the number of graduates has expanded, increasing their projected repayment levels.[19] However, absolute state contributions are greater than in the pre tuition fee period due to loan subsidies and increased student numbers (although as we will see state per student funding has been cut dramatically).

Universities meanwhile have benefited from the increased resources available to them, though freezes in the real value of tuition fees between 2012-2017 has seen their income dip somewhat; this is likely to change again in subsequent years as fees are allowed to rise with inflation or more[20]. But students

[19] Belfield et al (2017) find that the figure for taxpayer expenditure on HE in 2012 may be over-estimated, due to high expectations on the cost of borrowing (2.2 percent) versus reality (0.7 percent).Walker and Zhu (2013) find the returns to degree attainment appear to have held strong even as higher education expanded dramatically.

[20] The new Teaching Excellence Framework (TEF) will allow universities who perform well in measures of teaching quality to increase their fees in line with inflation.

themselves have been one of the main beneficiaries of the reforms: students have ten times the amount of financial support compared to the pre-tuition fee era. A key consequence of the reforms has been to enable students to access more of their future earnings as graduates to support current expenses while enrolled.

5. Quality, enrolment and equity in the post-reform era

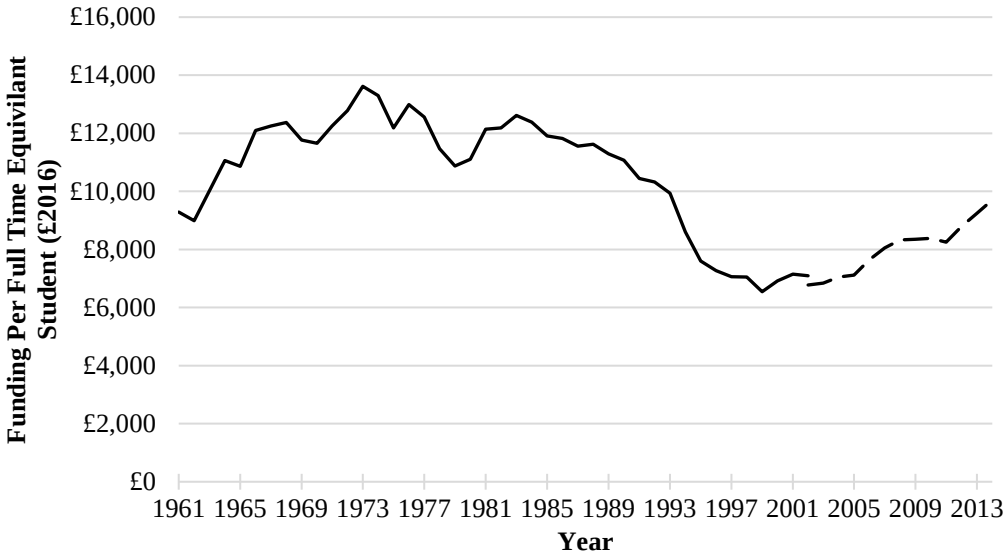
Our goal is to understand how the UK's set of tuition fee reforms beginning in 1998 impacted quality, enrolments and access. In this section we present our descriptive evidence on how these three metrics have evolved since the adoption of fees, examining each in turn.

5.1. Quality

Figure 5 plots resources (including both government funding and tuition revenue) per full-time equivalent higher education student (regardless of domicile and level of qualification) over the 53 year period between 1961 and 2014. Thus, the figure shows the amount of income available to institutions to educate each student per year and how this has evolved over the past 50 years.

As Figure 5 shows, in the 1970s, institutions were historically well funded; funding reached a high of almost £14,000 per head. As is evident, however, government funding did not keep pace with the rapid increases in student numbers which occurred throughout the 1980s and 1990s. This resulted in funding per head decreasing throughout this period, reaching a historical low of just over £6,000 per head in 1999 – less than half of its level some 20 years before. However, since 1999 (just after the reform, when most students were still grandfathered under the old system), funding per head has increased by nearly 50 percent and is now back at levels experienced in the early 1990s.

Figure 5: Average Funding per Full-time Equivalent Student



Sources: Statistics for 1961-2002 are taken from *Carpentier (2004) and* Statistics for 2002-2014 taken from Higher Education Information Database for Institutions All figures expressed in constant 2015 pounds sterling. *authors' calculations.* FTE enrolments used in the computation contain all student types (full-time, part-time, postgraduate, undergraduate, UK, EU, overseas); funding per head is for all students and comprises teaching grants and tuition fee income (the latter for all student types listed above).

Figure 5 illustrated funding per head for all types of higher education students (full and part time, undergraduate and graduate, EU, non-EU and overseas). However, the HE reforms we describe were focused mainly at full-time domestic (UK and EU) undergraduate students. Thus, in Figure 6 we focus purely on this group students. We also divide spending into its two separate elements – that coming directly from the state in the form of teaching grants, and that from tuition fees. Teaching grants are paid directly to universities via the Higher Education Funding Council (HEFCE), and vary based on the subject the student is studying.[21] High costing subjects, such as those requiring laboratories, are awarded more money per student, and low costing subjects taking place in the classroom, are awarded less[22].

Panel A of Figure 6 plots the teaching grant per student over time from 1997 to 2015 for the two most common subject categories - lab based, and classroom based. As Panel A shows, income coming direct from the government to universities fell dramatically in 2012 as the government cut its contribution.

[21] There are five subject categories – A (clinical years of study for medicine, dentistry and veterinary science), B (Laboratory-based science, engineering and technology subjects), C1 (Intermediate-cost subjects where average costs of teaching across the sector exceed £7,500 per year), C2 (Other intermediate-cost subjects with a laboratory, studio or fieldwork element, such as geography, mathematics, languages or psychology) and D (Classroom-based subjects such as humanities, business or social sciences).

[22] See HEFCE (2016) for full details of the subjects within each category, and the funding received

Whilst all fields experienced sharp funding cuts, the expensive lab based subjects experienced the highest absolute cut in income from the government. However it is notable that government funding for classroom based subjects such as humanities, which represent approximately 44%[23]of students, was cut to zero.

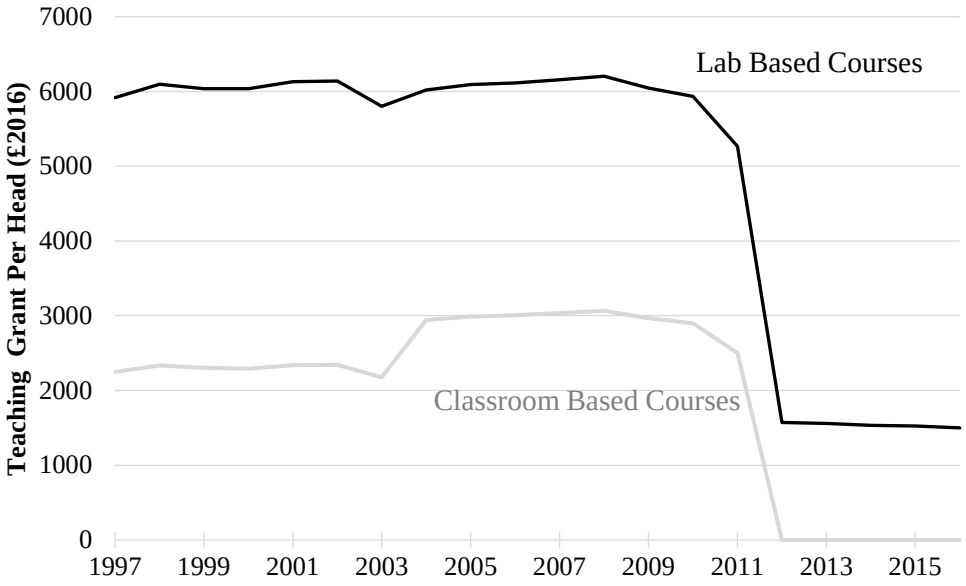
Of course, the point of the 2012 reforms in particular was to shift expenditures away from the state to the student. Thus, whilst state funding was cut, tuition fee money was intended to make up the difference. Panel B illustrates the impact of this by plotting teaching money (as described in Panel A) *plus* tuition fee money. Thus Panel B shows the overall teaching resources available to universities per student. Note that although since 2006 universities could choose to vary tuition fees by subject (in a way similar to the above, or in some other way, such as according to demand), almost all have chosen to charge the maximum fee allowable across their entire range of courses.

As Panel B shows, the fee increases more than replaced the lost revenue from teaching grants. The net result was large percentage increases in undergraduate teaching funding over time, with clear jumps after the 2006 and 2012 tuition fee increases. From this we can conclude that increasing the tuition fees has increased the total funding per head.

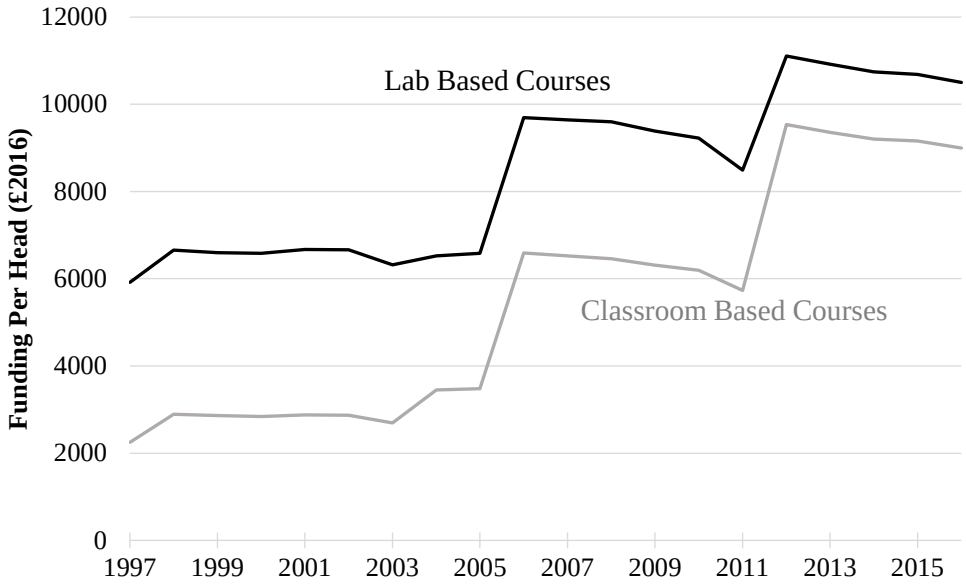
[23] Authors calculations based on UUK report (2016). Categorising the following subjects as class D or C2: Maths, Business and Administrative Studies, Social Studies, Mass Communication, Law, History and Philosophical Studies, and Languages. Universities can apply to have their courses in a different category and so this is an approximation.

Figure 6: Funding Per Domestic Undergraduate

Panel A: HEFCE teaching grant



Panel B: HEFCE teaching grant plus tuition fees



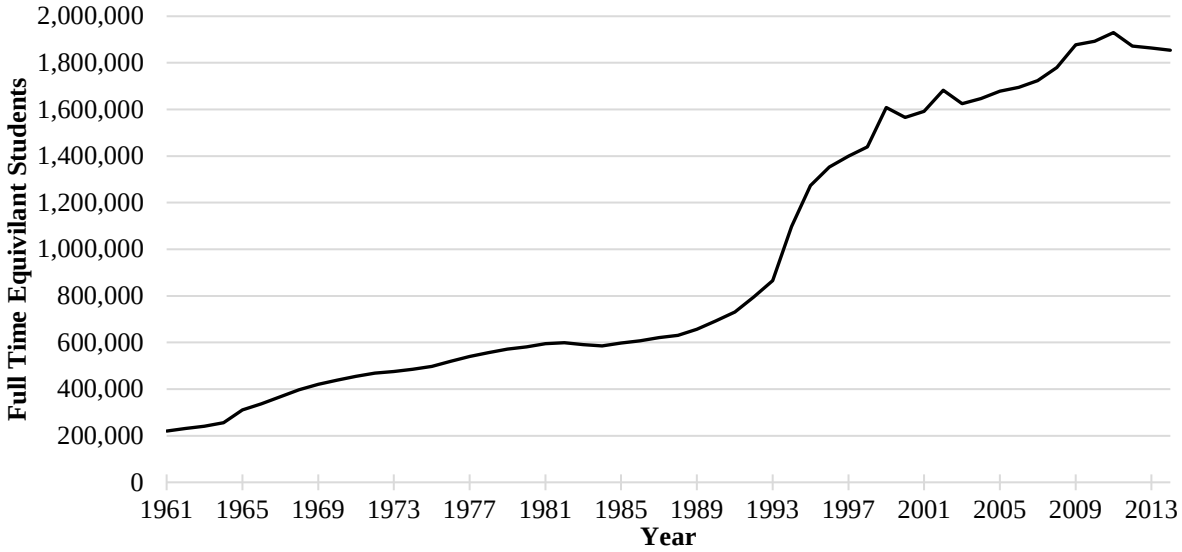
Source: Authors' calculations using data from "Guide to funding: How HEFCE allocates its funds", 1997-2016, Higher Education Funding Council for England. Notes: Lab based courses are in funding Group B and include pre-med, science and engineering. Classroom based courses are in Group D and include humanities and social science. Other fields not shown are groups A (medicine, dentistry and veterinary science) and C (subjects with a studio, laboratory or fieldwork element). These groups follow the same basic pattern, with A group courses having significantly higher levels of government funding, and C group courses between groups B and D.

5.2. Quantity (enrolments)

We now examine the quantity of students in the system, in particular testing the hypothesis that the increases in the costs experienced by students as a result of the reforms may have resulted in declining enrolments. Figure 7 plots the number of full-time equivalent students (again all types of students at all levels, re-weighted to account for part-time students) over time over the 53 year time period of 1961-2014.

As Figure 7 shows, despite the increase in costs, aggregate enrolments continued to rise, increasing from 1.44 million in 1998 to 1.93 million by 2011. It is notable, however, that after the reforms the rate of growth in enrolments slowed down considerably compared to the 1990s. It is also notable that since the most recent increase in fees there has been a marginal fall in total enrolments to 1.85 million.

Figure 7: Full-time Equivalent Enrolments Over time

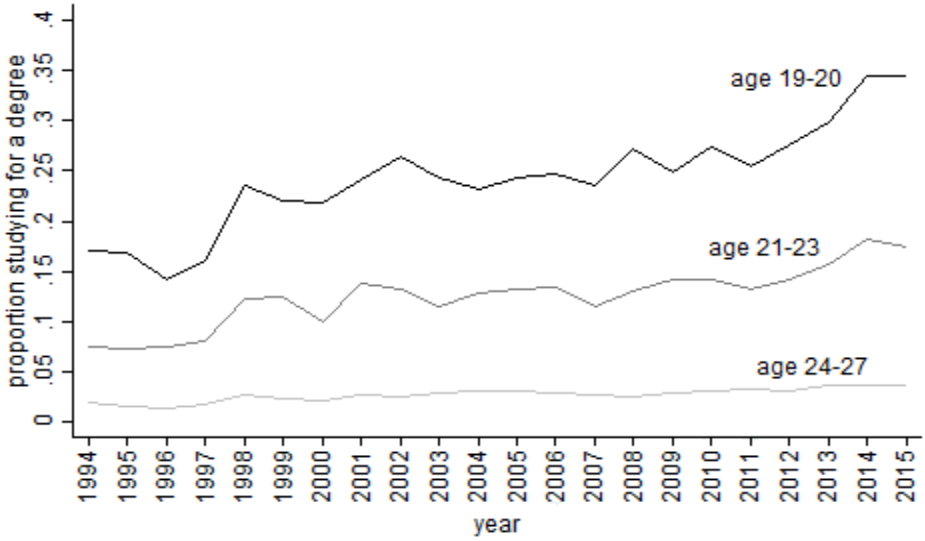


Notes: Authors' calculations using HESA. Source: HESA (2002-2015) The underlying HESA data exclude enrolment in polytechnics prior to 1994. We estimate total enrolment for earlier years assuming that both types of institutions grew at the same rate in the year of the change, and that enrolment at these institutions was a constant fraction of total enrolment.

Again however, this figure comprises all student types, but arguably analysis of the impacts of the finance reforms should focus on domestic undergraduate students, as the group that were directly subject to the fee and other finance policies in question. Thus, we draw upon data from the national Quarterly Labour Force survey in Figure 8 to examine changes in enrolment rates purely for undergraduate domestic students.[24]

[24] Unfortunately, due to data limitations we cannot extend this series prior to 1994.

Figure 8: University Enrolment Rates by Age Group Over Time



Source: Wyness calculations using restricted-access data from Secure Lab: SN6727 Quarterly Labour Force Survey, 1992-2016: Secure Access.

As Figure 8 illustrates, enrolment rates in undergraduate courses have also increased among young adults in the period since the reforms. Among traditionally-aged students (those entering university immediately after school, aged 19/20) enrolment rates have more than doubled, rising from around 16 percent in the years just prior to the changes to around 35 percent in 2015. Enrolment rates among older age groups have also approximately doubled since the pre-reform period.

Changes to legislation on number controls are also likely to have had an impact on student enrolment. Controls were relaxed around the introduction of fees in 1998, which may account for some of the increase among traditional-aged students occurring around that time. Controls were also relaxed in 2012, beginning with a removal of the numbers cap on high achieving students (those attaining AAB or more in their A-levels). This was extended to those students attaining ABB or more in 2013, and culminated, in 2015, with a complete removal of caps on university enrolments[25]. The removal of these number caps – made possible because of the changes in the structure of university finance – does appear to coincide with a period of growth in student entry rates, though of course, we cannot attribute these increases to changes in either the HE finance structure or numbers caps.

As well as full-time undergraduate students, the 2012 reforms in particular directly impacted part-time students. And whilst enrolment continued to increase among full-time undergraduates, the same is not true of part-time students. Indeed, since 2011/12, the number of part-time students starting a degree has fallen by 46 percent from 275,000 to 150,000 in 2015/16 (McNally & Wyness, 2017). The reason for these

[25] See Hillman (2014) for a detailed guide to the removal of numbers caps.

substantial falls in the number of part-time students have been widely discussed in the media (Callender, 2017) and reasons directly related to the 2012 finance reforms are widely accepted to be accountable for the dramatic drop in numbers.

As described above, the 2012 changes withdrew most of the public funds universities received for teaching, to be replaced by higher tuition fees. These were capped at £9,000 per year for full-time courses, and £6,750 per year for part-time courses – significantly higher than many fees previously paid by part-timers. The government hoped that, by extending income contingent loans to part-time students, they would be insulated from the reforms in a similar way as full-time students. However, not all part-time students can access these loans. Instead, loans are restricted to those who have not previously had a qualification of an equivalent level, studying on courses with 'course intensity' of 25% or more, and following a full course with a specified aim (rather than, say, an individual module). Since 53% of part-timers already have a previous qualification and many are studying on so-called 'bite-sized' courses (HEPI, 2016), many part-time students are unable to access income-contingent fee loans, and would instead have to pay their fees up-front. Moreover, part-time students may have a different response to income contingent loans than more traditional students. Around 80% of part-time students work during their studies (HEPI, 2016), meaning they are already above the earnings threshold for loan repayment. This means they would have to start to repay their loans before even acquiring their degree – a factor that may make fee loans unattractive.

All of these factors are likely to have contributed to the sharp drop-off in part-time numbers, and indeed at the most extreme this situation illustrates what may have occurred had the government increased fees without providing accompanying financial support (albeit among individuals who already have a degree level qualification). If the government is interested in lifelong learning then, perhaps of most concern is that the fall in part-time students has been greatest among older students, those wanting to do "bite size" courses, and those with low-level entry qualifications—all typically "widening participation" candidates (Callender, 2017).

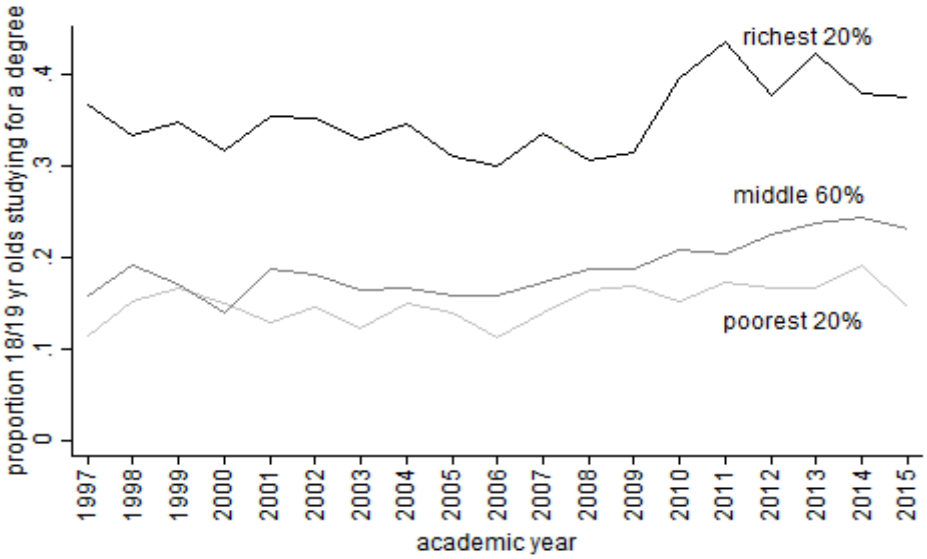
5.3. Equity

Our final outcome of interest is student access. Here, we are interested in whether the tuition fee reforms may have inhibited enrolments of students from disadvantaged backgrounds, a widely documented concern accompanying all sets of reforms (McGuigan et al, 2016).

In Figure 9 we examine enrolment rates by parental income for young students who are still classified as part of their parents' household. We plot higher education entry rates among students from 3 household income groups, which we define following the analysis of Blanden and Machin (2004) as those from the poorest 20% of households, the middle 40%, and the top 20% of households. As Figure 9 shows, enrolment is higher now for all groups than it was in 1997, in line with the findings described in Section

5.2. Despite the significant policy changes over the period, the participation gap between groups has remained relatively stable – though it still remains considerable, at around 20 percentage points between students from the top and bottom earning households. The gap between income groups narrowed up until 2009, when there was an increase in the proportion of individuals from high income households attending university. The increase for the high-income group coincides with the broadening of the eligibility criteria for maintenance grants and loans that occurred around this time.[26] The chart also shows that – again despite the increases in fees over this period – enrolment from young people from the lowest income families increased fairly substantially between 1997 and 2014 (in fact the enrolment rate between that time period went from around 11% in 1997 to 19% in 2014), though there is a noticeable drop in participation of this group in 2015.[27] It is not clear whether this drop represents a genuine change in trend or idiosyncratic sampling variation due to the restricted sample sizes in the LFS. Thus, below in Figure 10, we also examine administrative data from UCAS over a similar time period.

Figure 9: Percentage of 18/19 Year Olds Enrolled in College, by Parental Income



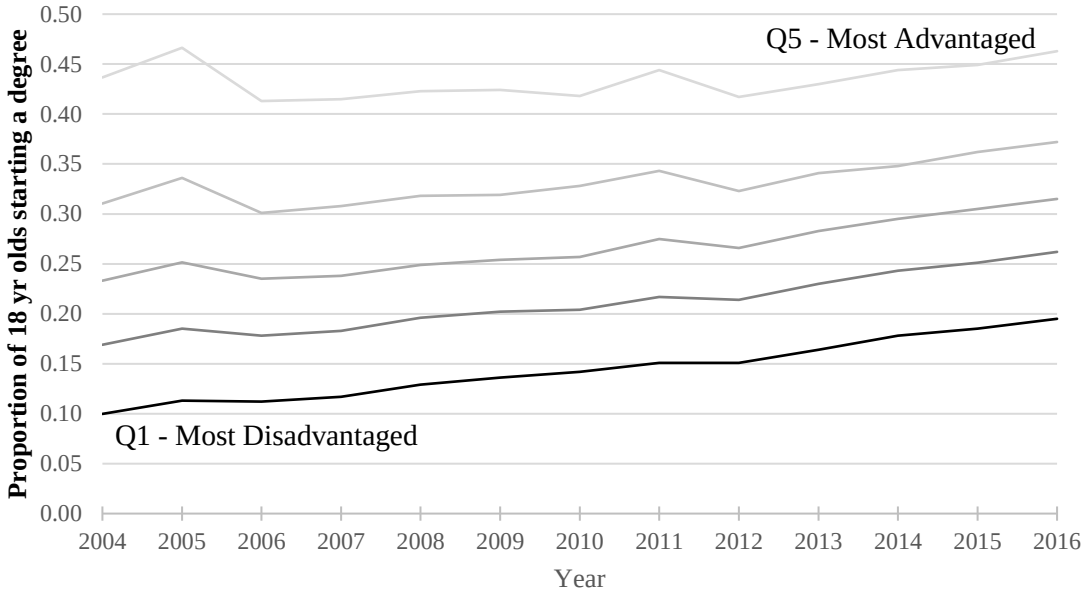
Source: Authors calculations using Secure Lab: SN6727 Quarterly Labour Force Survey, 1992-2016: Secure Access data. Figure cannot be extended prior to 1997 due to small sample sizes.

[26] The grant previously only extended up to households of incomes up to £38k, but this was extended up to £60k in 2008/9, such that a student from a family with income of £50k would receive £583 in grants Moreover in 2009/10 the maintenance loan formula was amended such that those from families with incomes higher than £25k received higher loans. A student from a household with an income of £50k, starting university in 2009/10 would receive £5024 in loans compared with £3385 two years before (the means tested maintenance grant was reduced).

[27] In both absolute and percentage terms, the gains for the low-income group between 1997 and 2014 are larger for the low-income group (7.5 percentage points or a 65% increase) than for the high-income group (1.2 percentage points or a 3.3% increase). Trends for the middle-income group are only slightly larger than those for the low-income group in absolute terms but not percentage terms (8.7 percentage points or a 55% increase).

Figure 10 plots administrative data from UCAS, which shows the university entry rate of 18-year-olds over time from 2004, this time using an area-based measure of advantage (Polar 3)[28] rather than parental income. Here we see that the proportion of students from the most disadvantaged quintile of wards (containing approximately 52 18-year-olds per cohort) enrolling in college has approximately doubled, from 10% in 2004 (when the fees were capped at £1,000 per year, and free to most students) to 20% in 2016 (when all students paid £9,000 per year). Meanwhile, there has been little change in the probability of enrolment amongst the highest quintile of wards. It is interesting to note that, again, this chart emphasizes that there has been no obvious "collapse" in entry rates among the most disadvantaged groups in the face of the policy changes – rather enrolment amongst individuals from this group has grown considerably.

Figure 10: Percentage of 18 Year Olds Enrolled in College, by Residential Advantage



Source: UCAS End of Cycle Report 2016, Figure 52 (2006 onwards) and 2013 Report Figure 56 (2004-5, adjusted by ratio of 2006 figures in 2014 report to those in 2013 report). http://www.ucas.com. *Note: Q1 is the most disadvantaged group, Q5 is the least disadvantaged. Proportion of all 18-year-olds resident in England by Polar 3 quintile of residential disadvantage*

[28] Polar classifies local areas into five groups, based on the proportion of 15 year olds who entered HE by the age of 19 during the 2005-06 and 2010-11 academic years. These rates are used to assign wards into five quintiles. Wards are a primary unit of electoral geography and there are 9,456 electoral wards/divisions in the UK. Each ward contains approximately 52 18-year-olds per cohort (HEFCE, 2005). Wards Areas in quintile 1 have the lowest participation rates while areas in quintile 5 have highest participation rates. The blips in trends that occur just after these years may reflect mean reversion. For more information see: http://www.hefce.ac.uk/analysis/yp/POLAR/POLAR3archive/

Our analysis of the changing socio-economic gap is consistent with the findings of Blanden & Machin (2013), who documented the rising income gap in college attainment during the 1980s and 1990s, and found that the socio-economic gap shrunk slightly in the years just after the reform, from 37 percentage points in 1999 to 34 percentage points in 2005.

A final measure of access we can consider is the average entry tariff scores[29] of college students before and after the reforms. This can be thought of as a measure of academic selectivity; a decrease in entry tariff scores could be interpreted as widening access to higher education to a broader pool of students. Since disadvantaged students are typically more marginal, in terms of their prior attainment scores (Chowdry et al, 2013), any reduction in entry requirements would be likely to benefit such students. However, it is important to point out that average entry scores could also be interpreted as a measure of institutional quality, hence a decrease could also be seen as a lowering of standard.

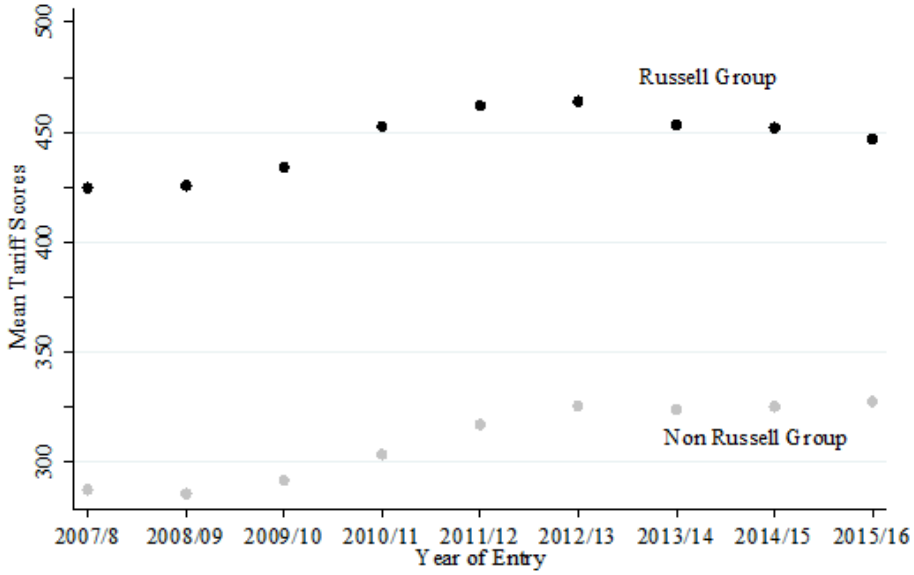
In Figure 11 we present the average entry tariff score for students between 2007 – 2015 for the most selective -Russell Group- and remaining universities, weighted by enrolment. As expected, average scores for the Russell Group set of research intensive universities are markedly higher than those of non-Russell Group universities.

Both groups are increasing up until 2012, after which there is a fall in the average entry scores of Russell Group students. There is no evidence that this fall reflected declining ability of young people in general. Indeed, the average high school grade was increasing up to 2011, and remained stable thereafter (JCQ (2016) Appendix Table A1).[30] Moreover, it is unlikely that the HE finance regime was somehow directly accountable for this widening of access to lower attaining student. Rather, it is more likely linked with the change in legislation at that time which lifted the cap on more able students. From 2012/12, universities could recruit unlimited numbers of students with AAB or more in their A-level grades, and from 2013/4 this was expanded to ABB students, culminating in the removal of all numbers controls from 2015/16. Evidently Russell Group universities appeared to have lowered their entry standards in order to expand, resulting in this fall in average tariff scores. It is notable that tariff scores of the other universities did not drop, likely reflecting the fact that only a small proportion of their student body would be affected by the initial relaxations. Unfortunately we are unable to see what has happened to average enrolment in the years after the controls have been completely relaxed.

[29] We define entry tariff scores here as the number of UCAS points. The UCAS Tariff is used to allocate points to post-16 qualifications. Universities and colleges may use it when making offers to applicants. A points total is achieved by converting qualifications such as A levels (and many others) into points, making it simpler for course providers to compare applicants. It is used as a means of giving students from the United Kingdom places at UK universities.

[30] The government has changed the relative importance of AS Levels during this time period. Fortunately this didn't happen until 2015, which means it will not impact the higher education system until 2017.

Figure 11: Average entry tariff scores by university type



Notes: Weighted average of student entry qualifications. For A-Levels the points are A 140, A 120,…E 40. For AS-Levels the points are A* 70, A 60…. E 20. All qualifications are counted, even those that are not part of the entry requirement e.g. General Studies and AS-Levels in unrequired subjects.*

6. Discussion

Our analysis shows that, since England's move from a free higher education system to a high fee, high aid system, university enrolment has increased substantially. However, unlike the situation documented during the rapid expansion of the 1980s and 1990s, these increases in enrolment have not mainly benefitted high income students. In fact, participation rates among the lowest income groups have increased at least as fast as higher income groups since fees were introduced, and the result is that the participation gap between rich and poor students has at least stabilized since 1997, or even slightly declined. However the most notable trend taking place in the years since 1998 has been the dramatic increases in investment in the sector. Student funding per head, which fell to a historical low of just £6,500 per student in 1999, has since recovered to around £9,700 per student – and as such is back at levels seen at the beginning of the 1990s.

Several features of the English reforms are apparent from our analysis. First, we have shown that the significant increases in the cost of HE attendance have been, without exception, accompanied with corresponding increases in student aid. Since 2006, no student has had to pay anything upfront. Tuition fees have been completely covered by a government loan, and loans for living costs have risen each year. The poorest students can now access £8,500 per year in aid, compared to less than £5,000 per year in the period immediately before tuition fees. The richest students have also experienced an increase in their liquidity,

with a rise in upfront resources from around £2,000 per year to over £4,000 per year. Whilst we cannot attribute the resilience of enrolments, and the improvement in access to the increased money for living costs, research (Dynarksi, 2003, Dearden et al, 2014) does support the positive role for student aid. Moreover, the decline in part-time students – who for the most part were unable to access maintenance or fee loans despite a sharp increase in fees – supports the conclusion that net liquidity is important along with net prices.

Key to this, however, is the ability for students to safely borrow against their future incomes. Unlike systems such as those in place in the US, UK students can access income-contingent loans which cover the full cost of their fees[31]. They can also borrow generous sums for living costs via the same system. The application for these aid programs is comparatively simple and integrated into the college application procedure. The take up of these programs is very high standing at 92 percent and 89 percent respectively (Bolton, 2017). Monthly repayments are calculated as a fraction of income earned above a minimum level (currently, 9 percent of income above £21,000) and collected via the payroll tax system, so payments are a low proportion of monthly earnings, the administrative burden is low, and the risk of default is minimized. One could think of the system of higher tuition fees and loan forgiveness to low earners to being analogous to the pricing discrimination implemented by private universities in the US. Where students from low income families are suberized by those from their wealthier peers. The difference being that with income contingent loans who is subsiding whom is dependent on the graduates' future earnings rather than the earnings of the students' parents. This income contingent system addresses several market failures including credit market failures.

Third, our analysis shows a dramatic upward shift in investment going into the higher education sector since the introduction of fees. This evidence highlights one of the key challenges facing a state-funded, expanding higher education system: insufficient resources. The UK's experience shows a clear unwillingness of the state to maintain per-head funding over the expansion period of the 1980s and 1990s. But it also implies that increasing the proportion of resources coming from the private sector via tuition fees can alleviate this problem.

Whilst our evidence generally describes a positive experience, at least in terms of our three key metrics, there are still a number of challenges facing the UK sector. A shortcoming of the UK income contingent loans system is that in their design, government bears the full risk of non-repayment whilst the university bears none. The university will still receive their tuition fee payment even if the student fails, or ends up with a low quality degree, or if they fare badly in the labour market. Thus, universities have little incentive to vary prices to reflect quality, and many may be charging prices that are higher than the cost of

[31] For a detailed description of the English ICL system and its lessons for the design of U.S. student loans, see Barr, Chapman, Dearden, and Dynarski (2017)

provision. Moreover, with the removal of the caps on student numbers universities will have stronger incentives to increase enrollment in low cost courses. A further issue concerning ICLs may be that their generous terms may encourage students to choose courses where ICLs are offered (e.g. in higher education) over a more appropriate course for them (e.g. further education). This inequality in provision of HE may lead to inefficiencies in the HE market.

Moreover, whilst the features of the UKs ICL system are attractive on paper, the system is complex, and many prospective students may struggle to understand its vagaries. The media has focused primarily on debt rather than the benefits of university or the nuances of the income contingent loans system, meaning many young people may not be aware of the income contingent nature of the loan (McGuigan et al, 2016). Other elements of the English system are also not easily understood. For example many English institutions give out generous institutional grants (bursaries) to poorer students. Yet it is highly unlikely that students know about this institution-level aid when they are making their enrolment decisions since there is no easy way for students to obtain this information (Murphy & Wyness, 2015). Research from other countries has shown that such complexity can a barrier to access (Scott-Clayton, 2012). No model is without its challenges. But the English experience suggests that making college completely free is hardly the only path to increasing quantity, quality, and equity in higher education.

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Appendix Table A1 -Average A-Level grade points of all A-Level takers

Year	Average A-Level points per qualification
2006	84.92
2007	86.08
2008	86.92
2009	87.82
2010	89.7
2011	90.18
2012	90.24
2013	90.42
2014	90.16
2015	90.48
2016	90.56

Source: JCQ (2016) Under the UCAS system, an A* grade at A Level is worth 140 points, while an A is worth 120, a B is worth 100, a C is worth 80, a D is 60, and a E is worth 40.

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