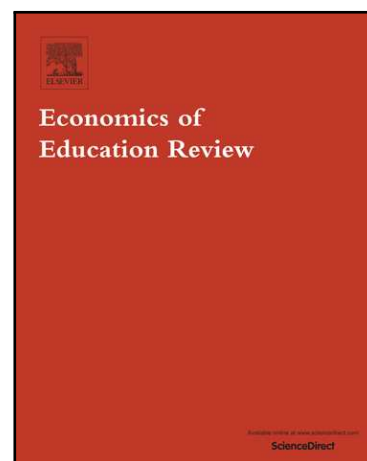


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The end of free college in England: Implications for enrolments, equity, and quality

Richard Murphy^{a,b}, Judith Scott-Clayton^c and Gill Wyness^{b,d}

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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 enrolments, equity, and proxies for institutional quality. 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 and rising enrolments, with no apparent widening of the participation gap between advantaged and disadvantaged students. The role of fees is moderated by other key features of higher education finance which may differ across countries: in contrast to other systems with high tuition fees, the English system is distinct in that its income-contingent loan system ensures that no tuition fees are paid upfront, and provides students with comparatively generous assistance for living expenses. Still, the English experience provides an instructive case for other countries considering implementing or abolishing tuition fees.

JEL classification: I22, I23, I28

Keywords: higher education, financial aid, tuition fees, inequality

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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, 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 campaign pledged that “every American who studies hard in school can go to college

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.

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 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 enrolment, access and quality? Is it possible to charge relatively high rates of tuition fees and also protect (and even improve) these three goals, or do tuition fees stand in the way of these 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 investment⁴. Yet, as described, there is far less consensus throughout the world 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 could attend university completely free of charge with no tuition fees charged to the student. Students were still expected to cover their own living expenses, which the majority did through a government backed student loan. 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 per annum – equivalent to about \$11,380, or 14% more than the average sticker price of a U.S. public four-year institution.⁵ The typical English bachelor’s degree

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)

⁴ Of course, in practice, university quality is hard to measure directly. In keeping with Barr (2013), who argues that “fees promote quality by bringing in more resources”, and supported by evidence in the US that per-student resources influence enrolment and completion (Bound & Turner, 2007; Deming & Walters, 2017), we use a funding per head as a proxy, along with student satisfaction.

⁵ In 2017-18, the average in-state tuition & fees charged by public four-year institutions was \$9,970 (College Board, 2017).

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.⁶

Several prior studies have examined specific aspects of this major policy shift over time. For example, previous studies have used particular elements of the reforms to estimate the causal effects of maintenance grant changes (Dearden et al, 2014) or bursaries (Murphy & Wyness, 2015) on student enrolment, while Azmat & Simion (2017) look for changes in enrolments, institution choices, and labor market outcomes for cohorts just before and just after reforms in 2006 and 2012. Dearden, Fitzsimons, Goodman and Kaplan (2008) focus on the effects of the 2006 reforms on the distribution of repayments across graduates, as well as the implications for taxpayer spending. Other studies focused on inequality in higher education have analyzed the connection with funding reforms (Blanden & Machin, 2013; Crawford, Dearden, Micklewright, & Vignoles, 2017).

These studies offer important evidence on the impact of certain elements of the reforms, holding all else equal. But, because the reforms were intentionally multifaceted, and rolled out over a long period of time, attempting to estimate the causal impact of one policy in isolation could lead to misleading conclusions and provide an incomplete picture of whether the reforms as a whole achieved the intended goals.

Yet, to our knowledge, there has not been an integrated, comprehensive assessment of the goals and outcomes of this massive policy shift. We believe that such an assessment—which by necessity is primarily descriptive in nature—can provide a valuable complement to more discrete causal analyses. Our contribution, therefore, is to synthesize the evidence to document how the burdens of higher education finance have shifted over the 20 years since the 1998 reforms, and to examine whether the totality of changes since then have been successful at meeting the goals originally set out by reform proponents, in terms of enrolment, access, and some proxy measures of quality.

In many cases, we draw upon (or replicate) previously reported estimates of student numbers, participation among specific student groups, taxpayer spending and university resources. But we also provide new estimates on student liquidity relative to the cost of living, student satisfaction since the reforms, and particularly around long-term trends in student funding per head, which we examine over a longer time period than prior work has done (for example we report student funding per head going back to the 1960s, and proportions enrolled back to 1994). We believe our analysis can provide a valuable case study for other countries currently without tuition charges (such as many in Western Europe), or for those contemplating tuition abolition (e.g. New Zealand; several US states). Though the contexts of each

⁶ Average debt figures for England are from Philip Kirby (2016), *Degrees of Debt*, London, England: The Sutton Trust. URL: <http://www.suttontrust.com/newsarchive/english-students-face-highest-graduate-debts-exceeding-ivy-league-average/>. Median debt was \$26,490 for US borrowers entering repayment from the most selective four-year undergraduate institutions in the US (The College Board, 2016).

country will be different to that of England (financially and politically), the underlying economic principles, and thus many of the underlying economic tensions may be similar enough to draw useful insights from the English experience.

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. While per-student funding is only the roughest of measures of institutional “quality,” we also show that student satisfaction rates have broadly increased over the course of the reforms.

Our results have important implications for other countries considering changes to their finance systems. Our work confirms that drawing on private resources can alleviate the challenge of insufficient resources that is present in free HE systems. Moreover, our study suggests that there are several key features of the English system that can 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. Indeed, student loans have the potential to be a powerful tool for college access, if the burdens of repayment are minimized and the system is sufficiently simple for students to understand its benefits (an area where England has been less successful).

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 degrees⁷, but which predominantly offer shorter vocational and professional credentials. Note that English universities can be thought of as largely public: though not nationalized, they are quite heavily subsidized and regulated, despite having high levels of autonomy (e.g. Watson, 2014)⁸. While the system includes a handful of private institutions⁹, nearly all higher education enrolment takes place via the publicly-funded system.

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.¹⁰ 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 450,000 (an 176 percent increase from around 250,000 students), but in the decade from 1986 enrolment increased by 750,000 students – 91 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 & 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

⁷ 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.

⁸ 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.

⁹ 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).

¹⁰ 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).

arrangements as universities, meaning they could become independent universities and award their own degrees (Williams, 1997).¹¹

These large increases in enrolment 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 following 1986.¹² In response, in 1994, the government imposed explicit limits on the numbers of state-supported students each university could enroll.¹³ 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 per year, barely half the level of per-student investment that the system had provided in 1973.

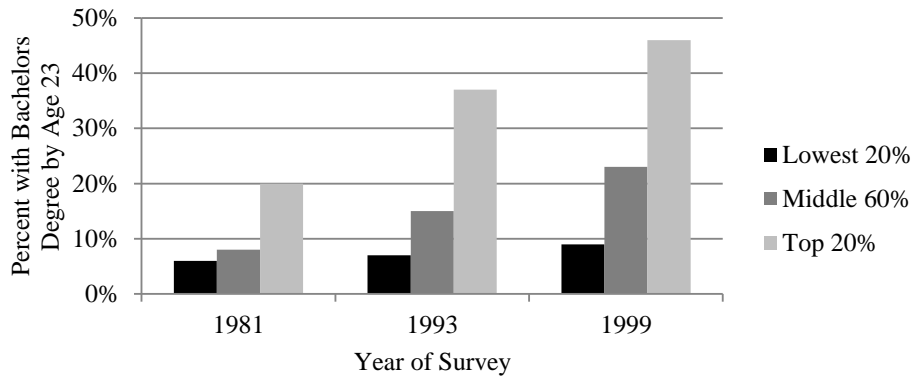
As well as the strain on resources, the sector was also not meeting England's other desired goal of access. Despite the fact that college was tuition-free and enrolments were increasing overall, the expansion of HE did not benefit all young people equally. Blanden and Machin (2004; 2013) study the gap 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 in 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

¹¹ 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.

¹² All currency amounts are converted to 2015 equivalents using data from Carpentier (2004).

¹³ 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.



Source: Blanden & Machin (2013), based on national longitudinal cohort surveys.¹⁴

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. However, it is clear that of the limited university places available to students, the free college tuition subsidy was increasingly going to those from the richest backgrounds. These students 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 1997.¹⁵ 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).¹⁶

¹⁴ The cohort turning 23 in 1999 was minimally affected by the 1998 reforms, as most of English students graduate by age 22.

¹⁵ Statistics compiled by the authors from Student Loans Company and the Office for National Statistics

¹⁶ 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

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 (disproportionately 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, 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

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.”

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. Friedman 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 more 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 (see Appendix Table 1 for a timeline and additional details)¹⁷. 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, to be repaid at 9% of the additional income over £10,000 per year, and with unpaid balances written off after 25 years.¹⁸

2006 reforms: In 2006, tuition fees rose to £3,000 per year; however, another 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. The repayment threshold had increased in the previous academic year and now stood at £15,000, meaning that students only started paying back their now combined maintenance/tuition fee loan once earning more than £15,000 per year. Means tested maintenance grants were also increased. 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, and the income contingent aspect of the loans means that the state is bearing the risk of default so that risk-averse students would not be put off. Universities also had to offer a bursary of at least 10% of the tuition fee to every student from a household with income of less than £25,000 per year.

2012 reforms: In 2012, tuition fees rose again, this time to £9,000 per year¹⁹. The ICL system was modified to apply a progressive positive real interest rate²⁰, but also to raise the minimum earnings threshold for repayment to £21,000 and to extend the write-off period to 30 years. A further important element of the 2012 reforms was that government funding to universities (known as the “teaching grant”) was cut dramatically. At the same time, the government began relaxing its direct control over student numbers, first allowing universities to enroll unlimited numbers of high-attaining students, and finally

¹⁷ Note that, as previously described, our focus is on UK/EU undergraduate students, the reforms that affected them, and how they were affected. But it is important to note that other groups of students were affected by the reforms in different ways – e.g. part-time and international students. The impact of the reforms on these students, while beyond the scope of this paper, is an important topic for further research.

¹⁸ For an overview of how the English ICL system and how it compares with the US student loan system see Barr et al. 2017. For a detailed examination of the changes see Crawford et al, 2017)

¹⁹ Note also that the small number of private providers that offer HE could also access tuition fee money, though only up to £6,000 per year.

²⁰ The interest rate for 2012 cohort will accrue at the rate of RPI plus 3% until the April after graduating, after which there will be a progressive rate of interest dependent on income. For those earning under the minimum repayment threshold the rate is RPI, this increases up to a maximum of RPI+3% at a salary of £41,000.

removing all controls in 2015. The 2012 reforms also introduced the (now abolished) National Scholarship Programme, in which governments allocated funding to universities to be spent on students from households earning below £25,000. Universities had to at least match the government allocated funding, and offer incentives such as fee waivers and cash bursaries. This is discussed extensively in Dearden and Jin (2014).

A number of further notable reforms have taken place since 2012. These include 1) the repayment threshold for the income contingent loan increasing by the Retail Price Index (RPI) from April 2012, 2) the abolition of maintenance grants in 2016/17 (replaced with corresponding increases in loans), 3) an increase in the tuition fee cap to £9,250 per annum in 2017/18, and 4) a further uprating of the repayment threshold to £25,000 per year in 2018/19. For the most part our analysis does not take account of these changes, though we would expect them to have some impact on our outcomes of interest. The changes in the repayment threshold results in a greater number of low-earning graduates avoiding repayment, and also has consequences for the relative burden of government/graduate contributions, as Table 1 implies. The impact of the abolition of maintenance grants may have a negative impact on access: students from poorer backgrounds now have to take out more debt than previously to achieve the same standard of living (and more debt than those from richer backgrounds which is an equity issue). Previous evidence (Dearden et al, 2014) indicates that the loss of grants is likely to impact participation, but there is less empirical evidence on the replacement of grants with loans, aside from one paper by Linsenmeier et al (2006), which studied this for one US college, finding mixed results. As the policy landscape continues to evolve, it will be important to continue to track the outcomes we examine below to understand the implications of these most recent changes.

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. But 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. As outlined, the reforms were complex in nature, involving not just changes to the nature of student finance, but to how universities are funded, and to how many students they could enrol. Causally evaluating this entire package of reforms would be extremely challenging given that many intentionally occurred in parallel. Therefore, 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 in their guide to conducting descriptive studies in education, 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. Where possible, we focus solely on full-time undergraduate students, since these are the group of students primarily affected by the English reforms (where data are more limited for this group, such as when examining university funding per head, we widen our focus). Loeb et al. (2015) 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.

We define our first outcome of interest, 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. When examining equity in access to HE, our second outcome of interest, we examine data on entry rates of 18 year olds by parental income background, and split by a geographically-based measure of advantage. We also examine data on enrolments of students from state versus private schools, and by the occupational status of their parents. 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," an admittedly rough proxy. Measuring quality is notoriously challenging in the higher education context,

given few countries have universal entry and exit tests from which measures of “value-added” could be constructed, nor are direct measures of inputs such as instructor qualifications or instructor-student ratios available in a consistent manner across institutions or over time. Still, in the US context at least, per-student spending appears causally related to student outcomes (Deming & Walters, 2017; Bound, Lovenheim, & Turner, 2010). We construct a consistent measure of per-student funding ourselves using data from the Higher Education Statistics 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 full-time equivalent (FTE) hours) at each institution in the same time period. This figure, by necessity due to data limitations, covers all student and course types, though we also present an equivalent figure for UK undergraduates, which requires stronger assumptions. We supplement this by an alternative measure of quality; student satisfaction scores from a major UK survey (the National Student Survey (NSS)).

3.2. Data sources

Our key data source for our measures of HE enrolment 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 student enrolment from different socio-economic groups. It also contains data on 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 enrolment 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 Office for National Statistics (ONS), the Student Loans Company, the Student Income and Expenditure Survey 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?

To get a broad sense of who pays and who benefits under England's changing models of higher education finance, Table 1 summarizes the winners and losers for each wave. It describes the net position of the reforms from the point of view of the four stakeholders – taxpayers (who pay into the system through funding universities, and through subsidizing income contingent loans), graduates (who also pay into the system through repayment of tuition fee and maintenance loans), universities, and students.

As Table 1 shows, the total resources flowing into higher education (from the taxpayer and from graduates) has increased dramatically since before the introduction of fees in 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. 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. There has been a clear upward shift in resources available to them, as a result of increased fee income, which has more than matched decreases in money coming from the government teaching grant (as will be explored more fully in Section 5.3). More recently, however, freezes in the real value of tuition fees between 2012-2017 has seen their income dip somewhat. But students themselves have been one of the main beneficiaries of the reforms: students have over four 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.

Table 1: Total Annual Funding Flows (£billion, 2016).

	1997-98	2011-12	2012-13	2017-18
<i>Funding sources:</i>				
Taxpayers	5.4	9.1	8.0	6.3
Graduates	0.7	6.3	11.0	12.2
<i>Funding recipients:</i>				
Universities	4.1	7.7	11.2	10.7
Students	2.0	7.8	7.9	7.9

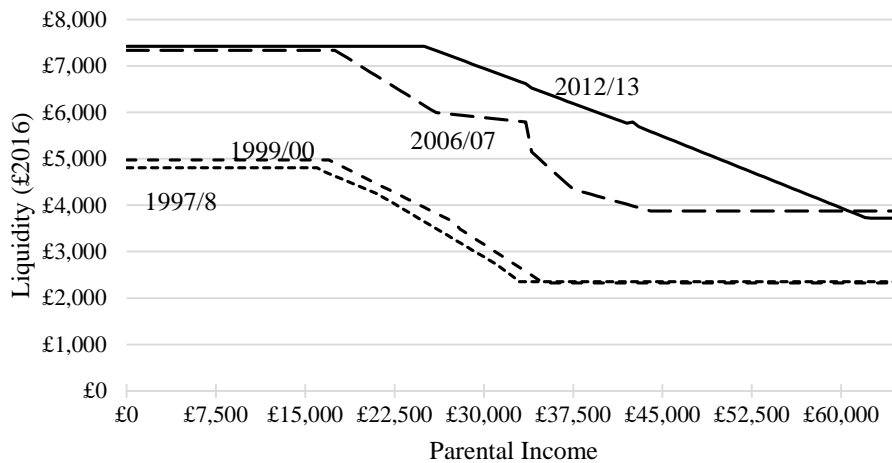
Source: 1997-98 figures are authors' calculations using data from Belfield et al. (2018). Taxpayer outlay consists of HEFCE teaching grant plus average maintenance grant, plus RAB charge associated with maintenance loan. In 1997 RAB is unavailable so estimated as 21% of the average maintenance loan issued in 1997, local authority fees are also included in taxpayer funding for 1997 only. Graduate outlay consists of net present value of fee and maintenance loan repayments; in 1997 this is estimated as average maintenance loan less estimated RAB charge. University income comprises HEFCE funding plus tuition fees, and includes local authority fees in 1997. Student income comprises maintenance grants plus loans, and, in 2011-2017 also incorporates fee waivers and national scholarships. 2011-12, 2012-13 and 2017-18 figures are based upon per-student figures from Chowdry et al (2012) and Belfield et al. (2018), converted to total amounts using their estimated cohort sizes. Graduate fee and loan repayment profiles are calculated based on future earnings projections. Official government discount rates are used in the net present value calculations. All figures expressed are for a 3 year degree, and in constant 2016 pounds sterling.

Indeed the reforms brought about substantial changes in the *net liquidity* (grants, plus maintenance loans, minus any upfront fees) available to students during their studies. This is summarized in Figure 2, which shows how the money available to students per year of degree when studying change over time by family income.²¹ 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” in Figure 2.

As Figure 2 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.

²¹ 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.

Figure 2: 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. Figures expressed as amounts per year. The unweighted average liquidity for students between £0 and £60,000 parental income was 1987/8 - £3,321, 1999/0 - £3,430, 2006/7 £5,520 and 2012/13 £6,241

This figure provides two insights. First, 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. Second, the progressivity of the liquidity structure has not changed much in the years since the initial reform; low-income students have always received more in terms of liquidity, but liquidity has risen similarly across income groups.²²

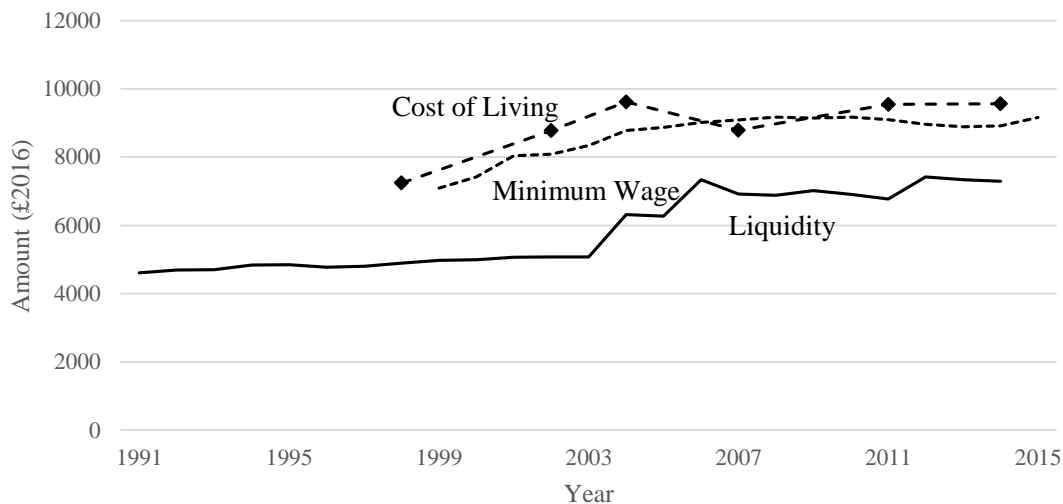
But, this does not necessarily mean that higher education is now “free at point of use.” Students face other costs of living, and the true cost of higher education includes not only the direct costs but also the opportunity costs of foregone earnings that otherwise would provide support. Thus, in Figure 3 we examine trends in students' access to liquidity as defined above (from the perspective of a low-income student with access to the maximum grant/loan), alongside two measures of the cost of living: first, the Student Income and Expenditure Survey's estimated cost of living for students, and second, the national minimum wage for 18-20 year olds (a measure of the government's minimum standard for working young people to live on). Figure 3 suggests that, while certainly rising over time (particularly as a result of the reforms from 2004 to 2006), student aid has never been sufficient to cover the cost of living,

²² 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.

measured either way. This suggests that for students without access to parental support, other sources of income such as from working or credit card debt, may be required.

As Table 1 also shows, graduates are required to make an increasing financial contribution to their education. However, the increase in tuition fees does not translate one-for-one into an increase in price paid for university. Because of the income-contingent loans system, the university “sticker price”, and resulting debt, is largely notional. 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 and debt forgiveness, every single graduate can have a completely different repayment profile. To put this into context, recent IFS figures (Belfield et al, 2018) show that around 77% of students would have at least some of their debts written off under the 2012 system, and figures (Britton, 2012) show that under the 2012 regime, graduates in the bottom 3 deciles of earnings would have 100% of their debt written off, whilst those in the fourth decile would have over 90% of their debt written off.

Figure 3: Net Liquidity (Grants+ Maintenance Loans-Up Front Fees) and estimated cost of living over time.



Notes: Minimum wage represents annual minimum wage for 18-21 year-olds working for 36hrs per week 48 weeks per year. Liquidity represents total net liquidity for a student with no parental income. Cost of living comes from the Student Income and Expenditure Surveys (1998/9, 2002/3, 2004/5, 2007/8, 2011/12, 2014/15). This is based on a representative survey of students' expenditure on living costs, housing and participation. From 2007 fee costs are not included as they are deferred. Figures are expressed as amounts per year.

5. Enrolment, equity and quality in the post-reform era

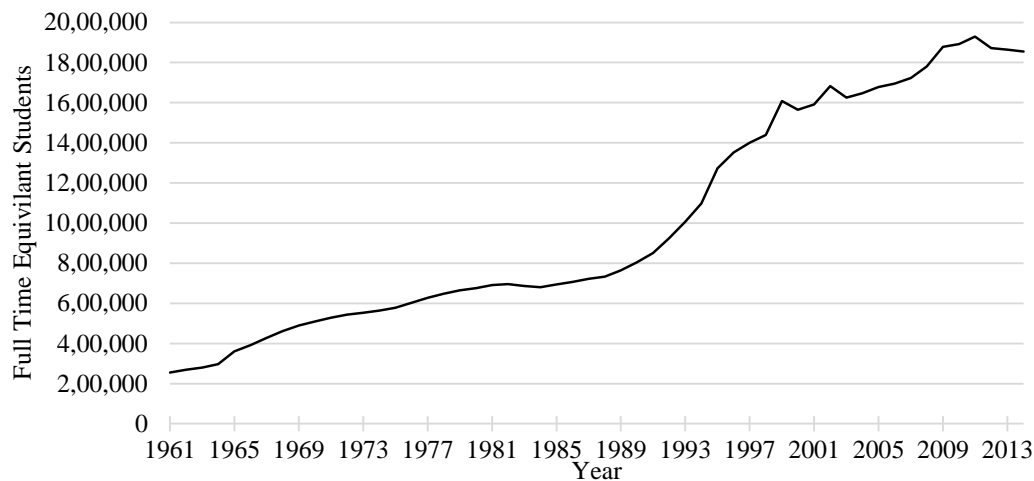
Our goal is to understand how the UK's set of tuition fee reforms beginning in 1998 impacted quality, enrolments and access. In this section we present our descriptive evidence on how these three metrics have evolved since the adoption of fees, examining each in turn.

5.1. Quantity (enrolments)

We first 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 4 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 4 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 million²³.

Figure 4: Full-time Equivalent Enrolments Over time



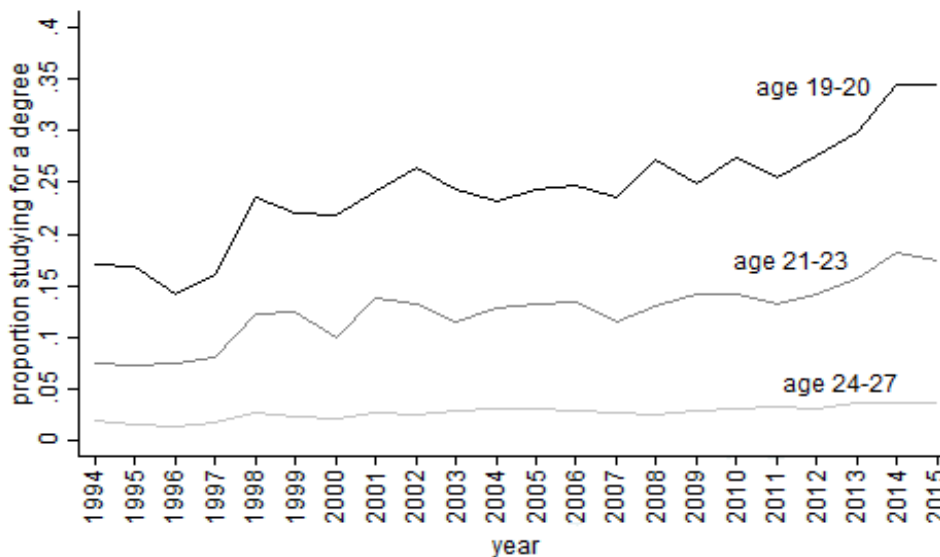
Notes: Authors' calculations using HESA. Source: HESA (2002-2015) The underlying HESA data exclude enrolment in polytechnics prior to 1994. We estimate total enrolment for earlier years assuming that both types of institutions grew at the same rate in the year of the change, and that enrolment at these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

²³ Figure 4 includes part-time / mature students, and therefore some of the slowdown in enrolments since 2012 is attributable to declining enrolments among this group.

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

As Figure 5 illustrates, enrolment rates in HE 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.

Figure 5: 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. $N=32,939$ (19/20 year olds); $N=46,953$ (21-23 year olds); $N=64,935$ (24-27 year olds). Data include part-time students.

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

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-levels²⁵). This was extended to those students attaining ABB or more in 2013, and culminated, in 2015, with a complete removal of caps on university enrolments²⁶. 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.

5.2. Equity

Our second 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 6 we examine enrolment rates by parental income for young students who are still classified as part of their parents' household²⁷. 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 5.1. 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.²⁸ The chart also shows that – again despite the increases in fees over this period – enrolment from young people from the lowest

²⁵ A-levels are subject-based post-compulsory qualifications taken by UK students at age 18 and are typically required by universities for entrance to university. University admissions are typically based on A-level grades achieved in three subjects.

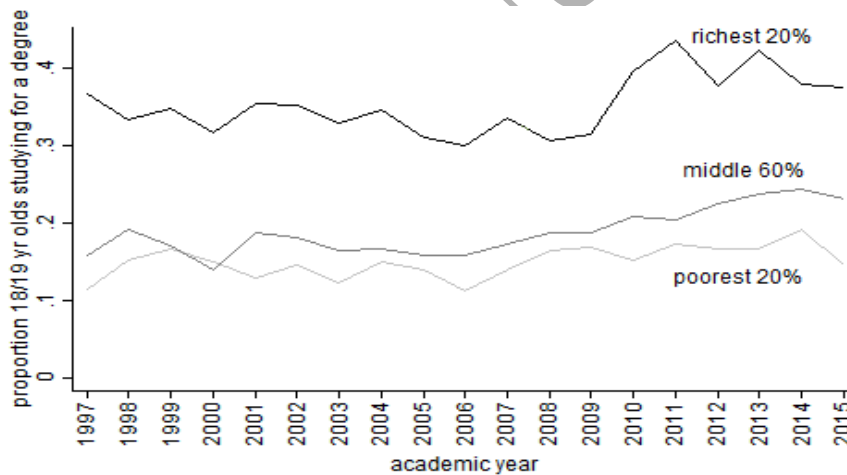
²⁶ See Hillman (2014) for a detailed guide to the removal of numbers caps.

²⁷ Note that, unlike in the case of enrolments by age (Figure 5) we examine enrolments at age 18/19. Limiting our focus to this group of students gives us the highest probability of obtaining parental income. This is because we only observe parental income for students living in the home or in halls of residence, which is most likely for first year entrants. See Dearden et al, 2014 for more details.

²⁸ 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).

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 2015.²⁹ 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 7, we also examine administrative data from UCAS over a similar time period.

Figure 6: 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. N=6,729 (poorest 20%); N=14,773 (middle 60%); N=5,821 (richest 20%).

Figure 7 plots administrative data from UCAS, which shows the university entry rate of 18-year-olds over time from 2004, using an area-based measure of advantage (Polar 3)³⁰. Here we see that the

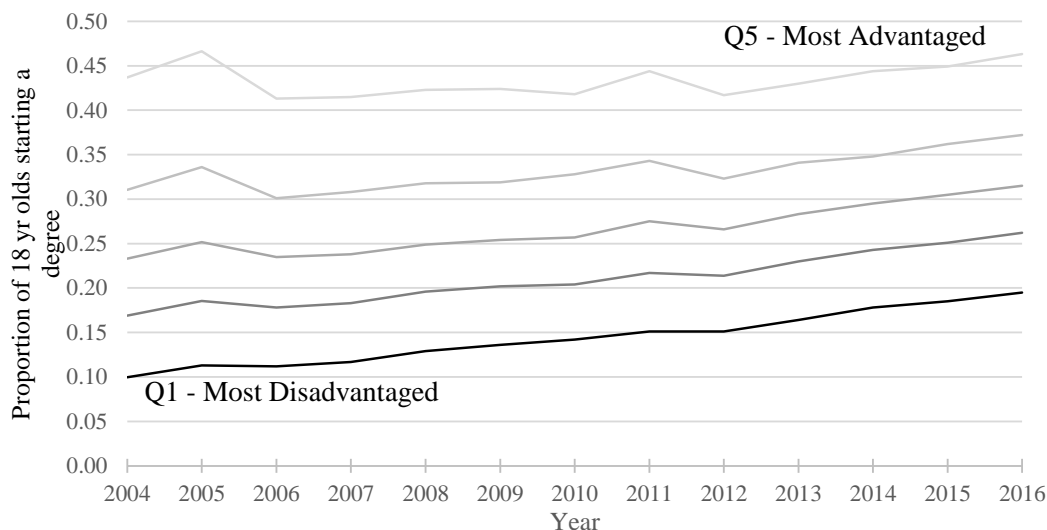
²⁹ In both absolute and percentage terms, the gains for the low-income group between 1997 and 2014 are larger for the low-income group (7.5 percentage points or a 65% increase) than for the high-income group (1.2 percentage points or a 3.3% increase). Trends for the middle-income group are only slightly larger than those for the low-income group in absolute terms but not percentage terms (8.7 percentage points or a 55% increase).

³⁰ 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

proportion of students from the most disadvantaged quintile of wards (containing approximately 52 18-year-olds per cohort (HEFCE, 2005)) 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. This chart emphasizes that there has been no obvious “collapse” in entry rates amongst the most disadvantaged groups in the face of the policy changes – rather enrolment amongst individuals from this group has grown considerably.

An alternative measure of access comes from HESA, and measures participation of undergraduates from low socio-economic households attending Russell Group and non-Russell Group universities, as measured by parental NS-SEC. This is presented in Figure 8.

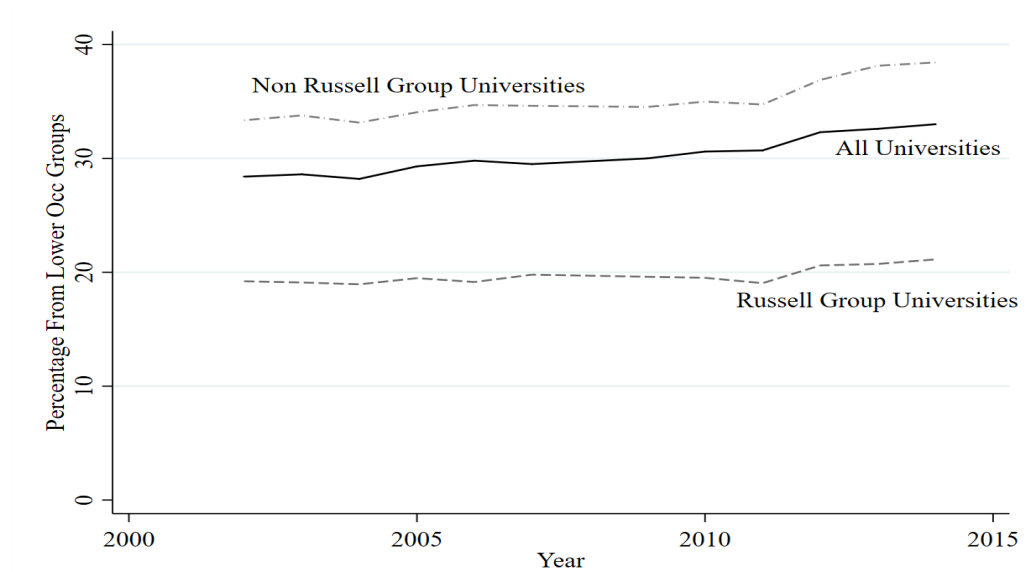
Figure 7: Percentage of 18 Year Olds Enrolled in College, by Residential Advantage



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

Figure 8: University Participation of lower socio-economic groups

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/>



Notes: Russell Group (upper series); UK Average (middle series); Non-Russell Group (lower series). Source: Data taken from HESA student population tables from 2002 to 2014. First time undergraduates with known parental occupational group. The lower occupational groups are the NS-SEC classes 4, 5, 6 & 7 (4 Small employers and own account workers, 5 Lower supervisory and technical occupations, 6 Semi-routine occupations, 7 Routine occupations).

As Figure 8 describes, despite the large changes to headline tuition fees the proportion of students from lower occupational groups among undergraduates has not decreased and since 2011 has increased from 30 to 32 percent of the student body. This growth has mainly occurred in non-Russell Group universities where now almost 40% of non-Russell Group students are from such backgrounds (vs 21% of Russell Group students).

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. Our findings also concur with those of Crawford et al (2016).

A final measure of access we can consider is the average entry tariff scores³¹ of college students before and after the reforms. One consequence of the reforms was that the government no longer had to directly subsidize students, making a relaxation of number controls possible. We are therefore interested

³¹ 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.

in the consequences of this relaxation in terms of which students benefitted. This measure 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.

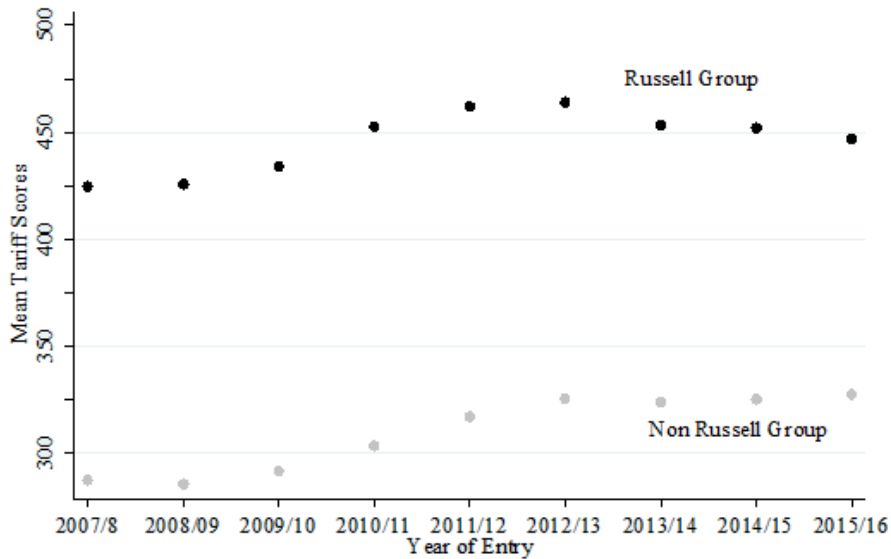
In Figure 9 we present the average entry tariff score for students between 2007 – 2015 for the most selective -Russell Group- and remaining universities, weighted by enrolment. As expected, average scores for the Russell Group set of research intensive universities are markedly higher than those of non-Russell 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).³² 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.³³

Figure 9: Average entry tariff scores by university type

³² 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.

³³ As well as full-time undergraduate students, the 2012 reforms in particular also 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 substantial falls in the number of part-time students have been widely discussed (Callender, 2017) and reasons directly related to the 2012 finance reforms are widely accepted to be accountable for the dramatic drop in numbers. However, analysis of part-time students is beyond the scope of this paper, but detailed explanations can be found in HEPI (2016).



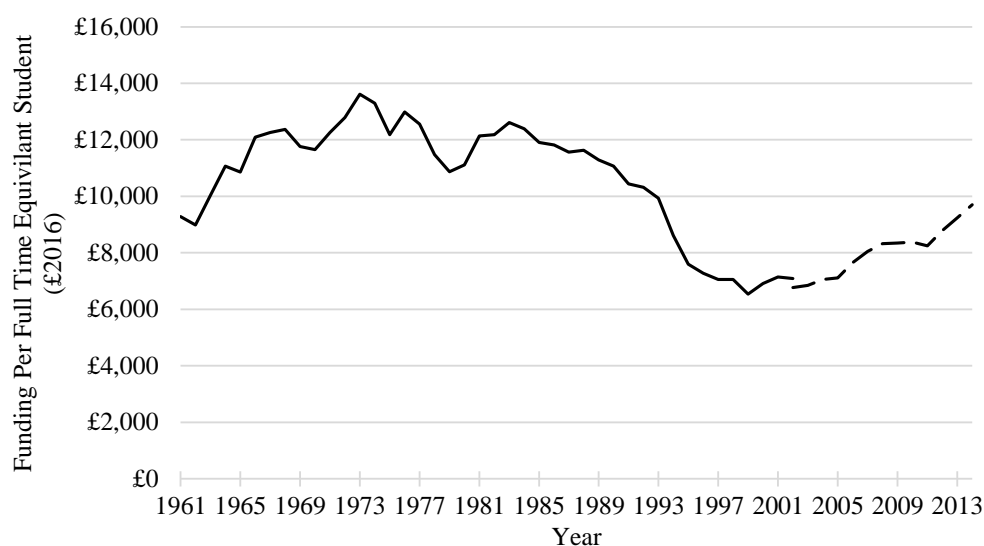
Notes: Weighted average of student entry qualifications. For A-Levels the points are A* 140, A 120,...E 40. For AS-Levels the points are A* 70, A 60.... E 20. All qualifications are counted, even those that are not part of the entry requirement e.g. General Studies and AS-Levels in unrequired subjects.

5.3. Quality

As discussed above, we lack direct measures of institutional quality such as instructor qualifications, instructor-student ratios, or measures of “value-added,” which these reforms may indeed have impacted. Still, because per-student expenditure has been shown to contribute to student outcomes in other contexts, we use it as a very rough proxy for quality here. Figure 10 plots resources (from all sources including grants for research and infrastructure, investments, fees, accommodation and consultancy) per full-time equivalent higher education student (regardless of domicile and level of qualification) over the 53 year period between 1961 and 2014. While this paper’s principal focus is on domestic undergraduate students, it is not possible to create this figure purely for undergraduates due to data limitations. The figure’s value is in showing 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 10 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 10: Average Funding per Full-time Equivalent Student



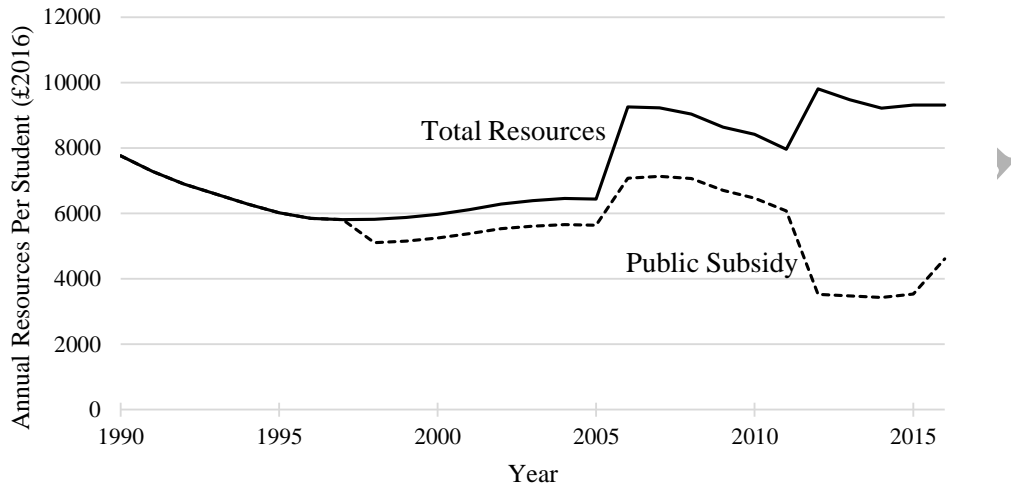
Sources: Statistics for 1961-2002 are taken from Carpentier (2004) and Statistics for 2002-2014 taken from Higher Education Information Database for Institutions. All figures expressed in constant 2016 pounds sterling, authors' calculations. FTE enrolments used in the computation contain all student 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). Figures expressed as funding per student per year.

Figure 10 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 11 we focus purely on this group students. We present historical data for two separate elements of funding – that coming directly from the state in the form of teaching grants and loan subsidies, and that from the student in the form of paid tuition fees for the entering cohort. We can see a similar pattern to Figure 10 with falling annual resources per capita in the early 1990's, from £8,000 to £6,000, leveling out with the first introduction of tuition fees paid by the student³⁴ in 1998. Here we see that total resources per undergraduate remained the same, but the contribution from the state fell. Resources per capita grew slowly until the increase of tuition fee cap in 2006, when they reached £9,250. Note that the state contribution also increased here due to the increased spending on loan forgiveness. There was another peak when the fee cap rose to £9,000 which coincided with large cuts in the teaching grant, this culminated in total resources per head reaching a high of £9,800. From this we can conclude that

³⁴ Previously there was a tuition fee that was paid by the Local Education Authority of the student. This tuition fee was not common knowledge as it was the same for all students at all universities and required no action on behalf of the student.

increasing the tuition fees has increased the total funding per head for undergraduates and lowered the public subsidy.

Figure 11: Resources Per Domestic Undergraduate



Source: Belfield et al (2018) annualized by authors. Government Subsidy includes teaching grants and LEA fees prior to their removal from 1998–99, expected fee loan subsidy for the average cost of non-repayment of student loans for fees. The up-front fees included in total resources and teaching grants prior to 2012–13 assume all courses are three years, so they represent a slight underestimate. The fee loan subsidy and teaching grants from 2012–13 onwards account for the actual course length. For 2006–07 to 2016–17, institution-specific bursaries and fee waivers (when appropriate) are deducted from total resources. For 2012–13 to 2014–15, National Scholarship Programme funding is included in teaching grants and in total resources.

Of course, this tells us merely about how much universities received in terms of funding. But, given our interest in university quality, we are also interested in whether these additional funds actually improved the university experience for students (and hence, whether students are receiving value for money). To this end, it would be most useful to understand how much of the increase in funds is actually spent on undergraduate teaching. Moreover, given that some subjects receive a subsidy from the treasury depending on their price band (e.g. STEM subjects), with the rationale being that they require specialized equipment to teach, it is interesting to note whether the subsidy plus fee received corresponds with the teaching offered (and indeed whether cross subsidization is taking place).

Unfortunately, we are not aware of any sources of information on how teaching money is actually spent. A study by Huxley et al (2018) examines cross-sectional variation in tuition revenue and teaching hours (using data collected from each institution by the authors) across institutions and subjects in the UK and finds little evidence that teaching intensity varies by tuition fees (though this finding is perhaps unsurprising given a lack of variation in fees across courses). The lack of available data on how tuition

fee money is being spent by institutions is problematic, and highlights an important area in which transparency could be improved.

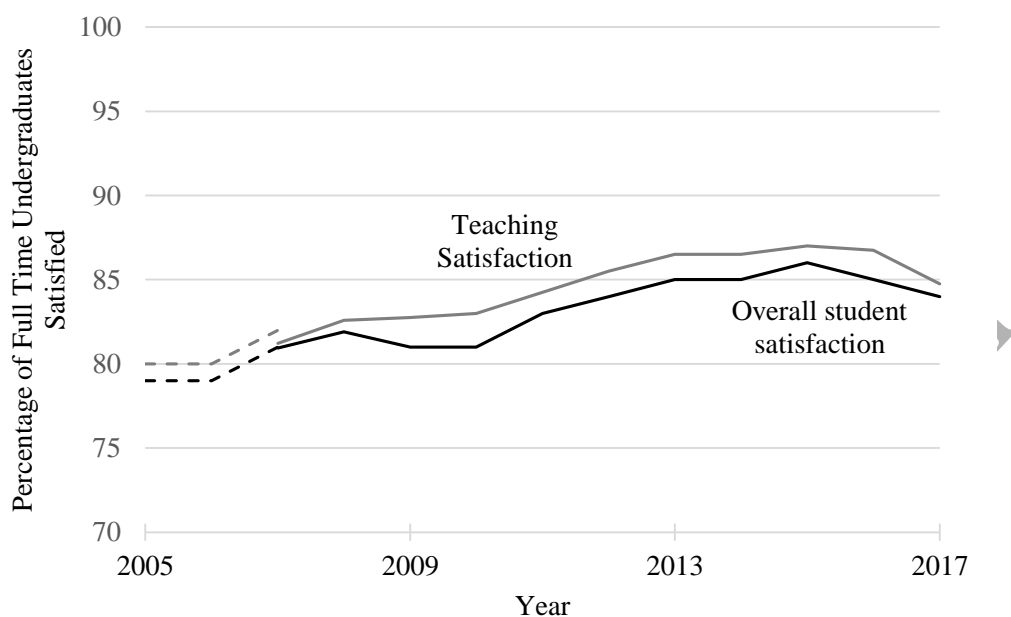
Government policy has also resulted in some fee income being earmarked for purposes other than teaching. Since 2012, institutions charging more than £6,000 per year in fees (the so-called basic rate) have to commit to spending at least some of their fee income above this level on outreach activities. Spending of this nature has been significant, with some 25% of additional fee income spent on widening participation activities. This spending was to be outlined in so-called “access agreements” which universities had to submit to OFFA, the fair access watchdog, for approval. Since this time, some 25% of fee income has been spent on widening participation measures, suggesting that the additional income generated by fees is by no means solely devoted to teaching or improving university quality³⁵.

In a final means of assessing university quality, we take data from the National Student Survey – which is an annual survey of undergraduate students’ opinions on the quality of their courses, conducted by HEFCE. The purpose of this is to “contribute to public accountability, help inform the choices of prospective students and provide data that assists institutions in enhancing the student experience”.³⁶ While such survey information may of course contain potential biases (for example, students responses may be influenced by their expectations of the course), the survey typically has high student response rates (with over 94 percent of universities having a response rate over 50 percent). Figure 12 presents these figures, for both teaching satisfaction (the upper series on Figure 12) and overall student satisfaction (the lower series).

Figure 12: Student Satisfaction

³⁵ The latest figures (OFFA, 2017, Table 1) show that 99% of universities chose to charge above the £6000 basic fee and were thus obliged to submit an access agreement in 2017. The estimated additional fee income received by universities for undergraduate students was £3134.8m for 2018/19 entry. Of this additional fee income, around 26% is to be spent on access measures, which include bursaries and scholarships (comprising about 37% of the total access spend), access measures (22%) and student success (23%) as well as other access measures such as fee waivers and hardship funds. Figures for 2013/14 (i.e. the year after these agreements were introduced) show a similar rate of spending committed to access/outreach though with some variation in how spending within this was allocated (see OFFA, 2013, Table 1).

³⁶ For more information see <http://www.hefce.ac.uk/lt/nss/>



Sources: National Student Surveys 2005-2017. From 2007 percentage of full time undergraduates who responded 'definitely' or 'mostly' agreed with the statement: I am satisfied with "Overall, I am satisfied with the quality of the course". For "Teaching on my course" this is the average of 1 - Staff are good at explaining things. 2 - Staff have made the subject interesting. 3 - Staff are enthusiastic about what they are teaching. 4 - The course is intellectually stimulating. For data series 2005-2005 these are using the equivalent point scores from full time students converted into a percentage into a total. Survey years refer to the previous academic year (i.e. results for 2017 refer to students whose final year was 2016/17).

As Figure 12 indicates, the large increase in tuition fees has not resulted in any great decline in student satisfaction – indeed satisfaction rose fairly consistently between 2009 and 2015 (the latter being the first cohort to graduate with full £9,000 per year tuition fees), though there appears to be a slight downward trend in evidence in later years, which will be important to monitor.

Despite this evidence that our rough proxies for quality show an improvement since the reforms, it is possible that truer measures of quality (e.g. instructor qualifications, student-lecturer ratios, or measures of "value-added") may not have been affected, or affected in a different way, for example if the increase in enrolments was not matched with an increase in the number of teaching staff, so that class sizes increased).

6. Discussion

We study the holistic impact of the UK's major overhaul of higher education finance – a multifaceted set of reforms which took place over a number of years, including reforms to how students pay for university, how universities themselves are funded, and the nature of government intervention in the sector.

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, despite fears to the contrary, our analysis shows no collapse in participation among those from lower socio-economic groups. Instead, our analysis shows that participation from this group has stabilized or even grown over the past ten years. 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.

What can other countries who may be considering altering their higher education finance systems learn from England's experience? Many Western European countries have particularly low or zero tuition fees (e.g. Ireland, Germany). Could England's experience offer lessons for these countries in introducing fees? On the other hand, countries and states like New York and New Zealand are considering abolition of fees. How might England's experience inform their thinking? While it is important to acknowledge the different contexts of these countries, there are a number of important general insights that can be drawn from England's experience.

First, policymakers should be talking about net liquidity – the costs students face and the resources they have access to up-front – at least as much as they are talking about tuition fees. A critical feature of tuition fees in the English system since 2006 is that no student has to pay anything up front: the full amount can be financed via government loans (in other words, fees are effectively deferred until after graduation). And while college is no longer free in England, students have access to more resources than ever before (via maintenance loans, and until recently, grants) to help pay for all the other costs that might stand in the way of enrollment (e.g., housing, food, books, and transportation). 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 (Dynarski, 2003, Dearden et al, 2014) does support the positive role for student aid.

Second, the income-contingent loan (ICL) repayment system put into place in 1998 makes it possible for students to safely borrow much higher amounts than they could otherwise. Unlike systems such as those in place in the US, English students can access income-contingent loans which cover the full cost of their fees³⁷. They can also borrow generous sums for living costs via the same system. In contrast, in the US, student loan limits are too low to cover even tuition at the typical public four-year

³⁷ 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)

institution, let alone the non-tuition costs of attendance, and many students default on debts well below the maximum levels. In another contrast with the US, the aid application in England 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.

Finally, the English experience leading up to the 1998 reforms starkly illustrates the key challenge of a free university system: insufficient resources. The English experience shows a clear inability or unwillingness of the state to maintain per-head funding over the expansion period of the 1980s and 1990s. Lack of funding can lead to declining quality, caps on quantity, or both, and prioritizing free tuition for all means less money to help the neediest students with additional costs. These risks are not hypothetical. For example, New York State's new free college plan includes stringent GPA, credit-completion, and post-college residency requirements, and stipulates that if the costs outstrip available funds, awards may be rationed by lottery or by adding additional criteria. New York's plan offers no new funding to institutions, raising the likelihood that per-student resources will fall as enrollments increase. Low-income students will see little additional support as a result of the program, because their tuition is often already fully covered by existing grants, even though they may still struggle to pay for rent, food, books, and gas. The English case, going in the other direction, shows how the introduction of tuition fees can lead to a dramatic upward shift in investment into the higher education sector.

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. For example, one 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 provision. This also highlights a lack of transparency in the system: little is known about how income going to universities actually relates to the teaching provided. While institutions are free to charge differential prices for different subjects and of course to lower their tuition fees altogether, in practice this has not occurred, again demonstrating a lack of incentive for institutions to do so. Whether the government should intervene and set differential fees by subject or institution is a complex question, however, since such a move could lead to credit constraints (e.g. if some institutions charged higher than the fee loan) and could have limited effects (since eventual repayment does not relate one-to-one with sticker price). Nevertheless, returns to undergraduate degrees in the UK have remained positive, high,

and stable over the past decade (the most recent figures suggest a return of around £168,000 over a lifetime for men, and £252,000 for women (Walker and Zhu, 2016)) suggesting students are receiving value for money at least from this perspective. However, evidence shows that returns vary considerably by subject (less so by institution) (Britton et al, 2016) with some subjects (e.g. economics, law) commanding a strong premium, while others (e.g. creative arts degrees) are considerably more risky, suggesting that while on average students likely receive value for money for their degrees, this may be questionable for some 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. A final and important point is that, according to our measures of the cost of living, the amount of money students have to live on from these loans may not be sufficient. This indicates that reforms have not yet achieved the goal of making university completely free at point of use, although trends in living costs shows that university wasn't completely free before the 1998 reforms, either.

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 be a barrier to access (Scott-Clayton, 2012).

Finally, while the loan repayment structure facing graduates is much more progressive than in the past, the structure of pricing and financial assistance by family income is not notably more progressive than it was before the reforms (though students from all income backgrounds have more liquidity). Moreover, students' available liquidity is still not enough to cover all of their living costs without resorting to employment or family resources (though this was the case even when tuition fees were zero). Since 2006, English institutions have been required to direct at least 10 percent of tuition revenues towards means-tested institutional grants (bursaries), a feature not reflected in our figures. Yet it is highly unlikely that students know about this institution-level aid when they are making their enrollment decisions since there is no easy way for students to obtain this information. All of this may help explain why gaps in access (and attainment) have not shrunk more substantially over time. Reducing the college

participation gap further may depend upon introducing greater progressivity into the centralized schedule of fees, grants, and loans, as well as upon efforts to reduce the disparities in pre-college qualifications by parental background.

In closing, rather than focusing higher education finance debates narrowly around the single issue of tuition fees, governments might instead consider emulating key features of the modern English system that have helped moderate the impact of tuition at whatever level it is set, such as deferring all tuition fees until after graduation, increasing students' ability to cover living expenses, and automatically enrolling all graduates in an income-contingent loan repayment system that minimizes both paperwork hassle and the risk of default. No model is without its challenges. But the English experience suggests that free tuition is hardly a required component of a higher education system seeking to increase quantity, quality, and equity in higher education. Indeed, the English case suggests that completely free systems can create their own barriers to these goals.

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Appendix Table A1: Key features of English postsecondary finance over time

Pre-1998	<ul style="list-style-type: none"> - 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	<ul style="list-style-type: none"> - 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	<ul style="list-style-type: none"> - Means tested maintenance grants eliminated
2004-05	<ul style="list-style-type: none"> - Means tested maintenance grants up to £1,000 reintroduced
2006-07	<ul style="list-style-type: none"> - Tuition fee increased to £3,000 and means-testing removed, but fee not charged upfront; 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	<ul style="list-style-type: none"> - Expansion of maintenance grants & loans to middle- and higher-income students - Means-tested maintenance grants increased up to £2,900
2011-12	<ul style="list-style-type: none"> - Means-tested maintenance grants increased to £3,250
2012-13	<ul style="list-style-type: none"> - 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	<ul style="list-style-type: none"> - 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).