

**Understanding the impact of institutional financial support on
student success: Phase One Report**

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Understanding the impact of institutional financial support on student success

Phase One report: Designing statistical instruments

Aims and objectives

The aim of this research is to better understand the impact of institutional financial support on student success of those from underrepresented student groups. The national strategy for access and student success called for measures that could result in “students from disadvantaged backgrounds completing their courses, fulfilling their potential and going on to their chosen career or postgraduate study” (BIS 2014). To this end OFFA's strategic plan expects institutions to take an increasingly evidence-led approach to improving performance across the whole student lifecycle (OFFA 2015). The current research focuses on the evidence institutions gather that help measure the impacts of institutions' financial support packages on three key areas:

- retention and progression
- success (degree outcomes, progression to further study and graduate employability)
- student wellbeing and participation throughout the student lifecycle.

The two-phase project is designed to initially identify the administrative data available to partner institutions and analyse it to measure the efficacy of their various financial support packages. The results of this analysis are being used to develop a survey tool that could be useful across the English higher education (HE) sector. The second phase of the research will be the piloting of this tool across a wider group of institutions in order to explore what we can learn about differential behaviour (in relation to financial support) with specific cohorts with shared demographic characteristics.

This **Phase One report** focuses on the management of administrative data and the design and testing of a statistical model. The statistical model was designed by a research team working across five partner institutions: Sheffield Hallam University (the lead institution for this project); the University of the West of England; Oxford University; King's College, London; and the University of Bedfordshire. During the summer of 2015 this model was tested using administrative data from all five institutions for academic years 2009-10 and 2012-13.

Background - the issues

While previous OFFA and other research finds no macro-level direct link between institutional financial support and applicants' choice of institution or students' likelihood of continuing in their studies (e.g. Callender, Wilkinson and Hopkin 2009; OFFA 2010; Harrison and Hatt 2012; Nursaw Associates 2015), other research findings suggest that financial support can be effective in certain contexts and for certain types of student. These can be categorised under three headings: complexity; effects on specific cohorts; and institutions' own evaluation which often finds some impact.

Complexity: The complex nature of financial support on offer to applicants has been seen by many as a barrier to simple comparison and applicant decision making. McCaig and Adnett (2009) noted that the plethora of competing institutional financial support schemes promoted in the initial set of OFFA access agreements led to "obfuscation rather than clarification from the perspective of the consumer" (p.18) (see also Callender and Wilkinson 2013). While all institutions were obliged to offer at least the mandatory £300 bursary for those applicants from poorer family backgrounds between 2006-07 and 2012-13 many institutions exceeded this amount and added specific scholarships for (sometimes limited numbers of) those from particular groups, e.g. mature or disabled students, those applying to shortage subjects and those that applied from schools and colleges with pre-existing links to the HE institution or who were otherwise deemed meritorious. This was seen as creating a market in bursaries in the absence of actual variable fees¹ as envisaged by government policy (HE Act 2004; Brown and Scott 2009; McCaig and Adnett 2009). The introduction of the National Scholarship Programme (NSP) to replace mandatory bursaries for all poorer students in 2012-13 further complicated the picture for applicants as awards were allocated post-enrolment and could have no effect on the decision making process (Diamond *et al* 2013; Bowes *et al* 2014; McCaig 2014). In some instances providing NSP awards actually reduced the amount institutions were able to afford to support non-recipients (McCaig 2014). A study by Carasso, Ertl and Holmes (2012) found that the complexities of institutional support schemes often result in potential applicants not even trying to gain a clear picture of financial cost and benefits of higher education (see also Esson and Ertl, 2014). Such complexities severely hamper our ability to evaluate the role of financial support as an element of student choice which is central to the marketisation aims of the 2011 White Paper (BIS 2011).

Impacts on specific cohorts. The literature identified in Nursaw Associates' report (2015) reveals the extent of variation in impact by specific group, notably in relation to different attitudes to debt among part-time (Callender 2013) and mature students (McVitty and Morris 2012; González-Arnal and Kilkey, 2009; Davies *et al*, 2010). Mature and part-time students are the two groups whose numbers saw the greatest falls since the introduction of higher fees and the groups least able to take on debt, although mature student numbers have since recovered. Work-based learners (Rose-Adams and Hewitt, 2012) are the groups most likely to cite financial issues as a reason for non-continuation in the studies, while disabled learners often have specific financial needs (Nursaw Associates 2015). Again, institutional research and evaluation often reveals the extent to which these cohorts rely on financial support to persist in HE. Furthermore some minority ethnic students are less tolerant of debt and thus less likely to take out loans and more likely to work during term time than their white peers (UUK, 2005); these same students also gain lower level degrees outcomes than white students (Stevenson 2012; HEFCE 2014; Mountford-Zimdars *et al* 2015).

Institutional research and evaluation. Institutional evaluative practice currently varies and it is a key objective of our research to design instruments that can be used systematically across the whole sector. There is some evidence that financial support is highly valued and essential for some student groups in certain contexts:

¹ Only one institution did not immediately raise tuition fees from £1,000 to £3,000 from 2006-07 and it followed suit two years later.

"[from] institutional findings it appears that there is a sizeable minority of students that feel that financial support does impact on their decision to enter higher education and in choice of destination" (Nursaw Associates 2015, p.4) even while this is not reflected in national findings. Similarly, institutional evaluations "show that students in receipt of financial support report that it has enabled them to stay on course and that they consider withdrawing less than their peers" (ibid, p.4). Internal research carried out at Sheffield Hallam University and similar work at University of the West of England found that financial support enabled recipients to devote more time to their studies because they did not have to take on as much paid work during the academic year, and this can have a tangible (if not always statistically significant) effect on retention and success rates, especially among poorer and (particularly) mature students who may also have caring responsibilities. This supports the findings of Moreau and Leathwood, (2006b) and Harrison, Baxter and Hatt (2007). Stevenson's research (Stevenson and Clegg, 2011 a and b) also found (negative) gender-specific implications for post-graduation employability for those students working part-time during their studies. Research on student parents also show that this group often experience acute financial issues and that financial support, in the form of, for example, loans, bursaries or subsidised childcare, can have a positive impact on their retention and wider experiences (Moreau & Kerner, 2012, 2015; Moreau, 2014; NUS, 2009), with similar patterns identified for other groups of student carers (NUS, 2013).

Methodology and methods

Phase One

Underpinning epistemology

The overarching research question for this project is: *Do financial bursaries for financially disadvantaged students ameliorate their educational disadvantage relative to other students?* There is an additional implied question of whether bursaries improve student outcomes relative to what they would have been without the bursary, but this cannot be directly examined as the research team is unable to manipulate the bursary allocation process to provide a full counterfactual analysis.

From previous research in the field, there is a reasonable assumption that students from lower income backgrounds participate in higher education at a relative disadvantage, compared to more affluent students. They are, for example, more likely to need to take on part-time work to support their living costs, limiting time for study. They are less likely to be able to afford books, equipment and materials to support their study. There may be other indirect forms of disadvantage too – e.g. due to accommodation options, which increase travel times or limit access to the wider university community. As far as the project team is aware, there are no compelling large-scale studies that demonstrate students from lower income households achieve significantly lower outcomes once in higher education, although this is a widespread belief within the sector.

Therefore, from a policy perspective, the primary role of bursaries is to enable students from low income households to participate in higher education on a broadly equal basis with their more affluent peers. It is not to attempt to provide an advantage to the extent that students with bursaries have significantly better

outcomes than those peers. This is an important point with respect to understanding the basis of analysis which underpins this project and the resulting statistical model. A second important point is that the students who are allotted bursaries may have some relative advantages to other students, as well as the disadvantages derived from their financial circumstances. For example, it might be hypothesised that such students have higher intrinsic motivation or resilience due to the barriers which they have overcome in order to participate. They may also have been targeted by school, university or other programmes which have been intended to improve their preparedness for higher education. As such, bursaries may also act as a proxy for a set of experiences, attitudes or behaviours that are not derived from the financial component of the bursary in any way. This constitutes a confounding factor within any statistical analysis.

The nature of the work is thus such that the research question has to be explored retrospectively, and the project team decided to build a statistical model using *binary logistic regression* within a *quasi-experimental study*, where bursary holders comprise an experimental group and other students comprise a comparator group. Clearly the latter cannot be a control group in the formal sense, as the allocation of bursaries is not randomised. In particular, the approach taken has focused on a comparator group which are deemed in each institutional context to be those students who are marginally less financially disadvantaged than the bursary group; this will be explained in more detail shortly.

The ensuing analysis from this model therefore enables the outcomes of the bursary group to be compared with those students who might be expected to have more positive outcomes, based on the hypothesis outlined above. There are three possible results from any analysis:

1. *The bursary group has significantly better outcomes than the comparator group.* This would be consistent with a strong positive impact from the bursaries, although there remains a possibility that there is a factor outside of the regression model which provides relative advantage to the most disadvantaged students, as discussed above.
2. *The bursary group has equivalent outcomes to the comparator group – i.e. no significant difference.* Bursaries are awarded to compensate for the perceived educational disadvantage derived from the financial disadvantage of the students. This result would be consistent with a positive effect of bursaries in ameliorating pre-existing disadvantage. Alternatively, it could be construed as evidence that the founding premise (that low income students have significantly poorer outcomes) is fallacious. It is not possible for analysis to distinguish between these options in the absence of low income students without bursaries.
3. *The bursary group has significantly worse outcomes than the comparator group.* While this would appear to suggest that bursaries do not have a positive impact on outcomes (as it is unlikely that they have an actively negative effect), it is important to stress that there is no direct counterfactual within the analysis. In other words, the outcomes for bursary holders could have been worse still without the bursary. In this instance, the bursary would

be providing a protective role, but not sufficient to overcome the underlying disadvantage for the group. Perhaps more importantly, this type of result would strongly suggest that household income is an important predictor for student outcomes which may or may not then be ameliorated by bursaries.

As such, it is important that the interpretation of the results in this report is nuanced and critical. In the absence of a true control group, formal inference of causality between bursaries and differences in outcomes is impossible. Nevertheless, in broad terms, a significant positive difference in outcomes should be interpreted as a strong evidence for the effectiveness of bursaries. However, this should not be seen as a specific criterion for demonstrating effectiveness. A result which sees no significant difference between the bursary group and the comparator group can also be interpreted in terms of a successful amelioration of educational disadvantage to the point where the students from the lowest income households are achieving on an equal basis to those in relative advantage. Indeed, even a negative relationship between bursaries and outcomes should not necessarily be interpreted as evidence of ineffectiveness. Rather these results could point to the depth or breadth of the disadvantage experienced by these students – i.e. that the bursary they have been awarded is insufficient, rather than ineffectual. The Phase 2 data collection, which incorporates a survey of recipients of financial support at each of the five partner institutions, should provide more insight on these matters.

Three other epistemological principles were followed within the design of the research:

- Firstly, interpretability of the results was prioritised at the cost of some precision through, for example, the conversion of continuous variables to categorical ones (e.g. age and entry tariff).
- Secondly, precision is also traded off against inter-institutional comparability, such that the model attempts to explore a sample that is broadly similar in its composition and avoids instances where there are differences in institutional practice. For example, some institutions only awarded bursaries after the 1st December census date, while other made them available from arrival, so only students persisting past the census date in their first year have been analysed to provide uniformity and comparability between the institutional samples.
- Thirdly, operationalisability for institutions was also prioritised. This was manifest in the use of ready-defined variables routinely processed by institutions and by the selection of an analytical technique that can be performed with common statistical software and by individuals with limited statistical training. For example, a multi-level modelling approach was considered to take account of within-institution clustering, but this was rejected as the technique is relatively advanced and likely to be beyond the capabilities of some institutions. Analysis has purposively been undertaken using SPSS v20, a readily-available package.

As a final epistemological point, it is important to contextualise bursaries within a complex social space. The sums of money available to most students are modest

and only comprise a small proportion of their overall income (typically around 10 percent in post-1992 institutions and 20 percent in pre-1992 institutions), while some students on tapered bursary schemes may receive very small amounts – indeed, bursaries of £50 or less have been ignored within the analysis. The effect sizes reported need, therefore, to be viewed within this context; bursaries are unlikely to be life-changing (at least at the economic margins) and there are many mediating and confounding variables influencing an individual student's educational outcomes, many of which are unmeasurable in the context of this study.

Model development process

The research team were able to draw on a working statistical model developed previously by researchers at the University of the West of England and the model described and reported herein was strongly based on this initial work, albeit with a wider dataset, longer timeframes and a more robust categorisation process.

The model development process within this project began by bringing together the data management teams at each of the five partner institutions. An early decision was taken to primarily base the model on data routinely produced to meet institutions' reporting process to HESA. This had the advantages of reducing analyst time and working with variables which had existing definitional consensus, although the project has revealed a number of instances where the HESA data was being prepared or interpreted in different ways between institutions. None of these issues is seen as being critical for the project, but future work will be required to resolve them. In addition to the HESA-led data, data were also integrated from Student Finance England (SFE) and from institutions' own student records data. The latter related to bursary allocations, home postcode (and various derived variables – e.g. POLAR quintile), degree outcomes and National Student Survey results. The use of academic engagement metrics was quickly rejected on the basis of concerns about availability, comparability and validity; the previous work at UWE had suggested that these had little relationship to bursaries, so this is not seen as a major limitation of the research.

Given the time constraints within this project, it was agreed that a single data capture exercise would be undertaken by the five institutional data management teams, with scope only for minor amendments and corrections. As such, the model presented herein was effectively fixed early within the project and the primary task has been to marshal the disparate data into a single framework that could be analysed.

As with all regression models, there is a required assumption that the model includes all relevant explanatory variables. The research team believes that it has captured all that are readily available from institutions, although there may be others that have not been considered to date. Also, it is important to reflect on the point made above that there may be individual social or psychological factors that have a strong relationship with outcomes, but which are not (and probably cannot) be captured by institutions.

Household income and bursary allocation

A key piece of data for this project is the student's Household Income (HI) as calculated by SFE. This not only formed the basis of bursary allocation in most

instances (see below), but it also provides a reasonably valid proxy for financial disadvantage as experienced by the student although there are many individual situations (e.g. non-contribution by parents or unearned wealth) that can confound this. The HI may be less valid for mature students whose own household is used and where income may be a less useful measure of disadvantage (e.g. in the context of savings or redundancy payments). For these reasons, it is important that HI is problematised and treated with caution in terms of interpretation.

Furthermore, it is not mandatory for students to provide information to SFE to permit the HI calculation unless the student wishes to apply for means-tested student support – e.g. student grant or the upper element of the maintenance loan. The data coverage of HI is therefore far from complete, with between a quarter and a half of students in each of the five institutions lacking this data. It is also possible for student records to lack this data if students refuse permission for SFE to share their data with individual institutions. In terms of the data available to institutions, it is not possible to distinguish between these two scenarios (i.e. non-provision and refusal for sharing). However, exploratory data analysis on the five institutions' datasets provided strong evidence that students lacking HI data were generally at the upper end of relative advantage on non-financial measures (e.g. from POLAR quintile 5 or with A Levels), so it appears reasonable to conclude that the numbers of students refusing data sharing are low and that students lacking HI are most commonly drawn from affluent homes as their income is significantly above the threshold for means-tested financial support. This assumption is clearly challengeable, but further analysis is beyond the resources available to the project.

Within the model, therefore, those students missing HI data were placed into a separate category for analysis along with those students with HI figures that were above the threshold for means-tested support.

In all five of the institutions represented in the research team, bursaries were allocated on the basis of HI to some extent. Typically there was a threshold below which bursaries were available and either (a) all students received one, or (b) there were further criteria (e.g. disability, care history) that were used to prioritise within the low income group. Therefore, in the first instance, bursary holders were compared to those with a slightly higher income than the threshold for eligibility. In the second instance, bursary holders could be compared both with those with a slightly higher HI and also with those with a similar HI that were not deemed priorities (for bursaries) through the secondary criteria. The threshold for bursary eligibility differed between institutions and between years, so separate analyses were required for each institution. Furthermore, across the five institutions, there were examples of bursaries that were both flat-rate and tapered, adding to the complexity further. Indeed, even among those institutions with tapered systems, some ran positively (i.e. lower income students receiving more bursary) and some negatively.

In addition, some institutions provided bursaries to students outside of the HI financial means-test – e.g. those entering from an Access to Higher Education course or partnership school – which were nevertheless awarded in the context of disadvantage and under the aegis of the access agreement. These were treated as a separate group within the statistical model as they spanned low and middle income groups, as well as those for whom HI data was absent.

As a result, the experimental and comparator groups were coded in the following format:

1. Low income bursary students (*key 'experimental' group*)
2. (Low income students without bursary – where additional criteria used to prioritise below institutional bursary threshold)
3. (Students with non-means tested bursaries – where awarded)
4. Mid income students without bursary, where mid income was defined as an HI between the institutional bursary threshold and the national upper threshold for means-tested student support (*primary 'comparator' group*)
5. High income students and those missing HI data (*secondary 'comparator' group*)

In the post-1992 institutions, the bursary thresholds were sufficiently low that it was possible to split the fourth group into two smaller groups to improve the granularity of the analysis. Where available, the second group was used as an additional 'comparator' group and the third group as an additional 'experimental' group.

Using this coding approach does mean that some of the precision within the HI data is lost, but this was considered to be an appropriate compromise to provide a more readily interpretable analysis. Alternative coding approaches were explored, but none provided substantively different results.

Datasets

Two cohorts were selected for analysis to allow for the exploration of different outcome measures: those entering in 2009 and those entering in 2012.

The dataset comprised the following:

- Full-time UK undergraduate status
- English domiciled – to avoid issues around conflicting student support systems in other UK jurisdictions
- First degree students (i.e. not sub-degree students [including foundation degrees] and not those pursuing an additional degree)
- HEFCE-funded – to exclude NHS-funded students with different student support arrangements who are often not eligible for bursaries
- On Year 1 of their programme – to exclude foundation year students and students transferring into second/third year of their programme
- Did not leave prior to 1st December in their first year – as some institutions only provide bursaries to students persisting after this date
- Did not leave due to completing their degree – to exclude foundation degree students transferring into a 'top-up' programme and similar
- Were not 'withdrawn' due to death or serious illness

There are still some minor unresolved issues with defining the dataset across the five partner institutions – see below.

Outcome measures

Following discussions within the team and with OFFA, the research team settled on four dichotomous outcome measures within the statistical models:

- *Retention into second year of study* (2012 cohort): this was based on whether a student appeared within the HESA return for the year following their year of entry. While broadly based on the performance indicator published by HESA, this measure differs in that institutions do not have reliable data on students transferring institutions; these are coded as having withdrawn in this analysis, which is accurate from an institutional perspective. Several definitional and data management differences have emerged between institutions.
- *Completion of degree within five years* (2009 cohort): this was based on whether a student had been classed as completing their studies according to the HESA definition within five years of their year of entry. Five years was chosen for two reasons; firstly, it accommodates four year degrees, and, secondly, it allows for a reasonable amount of false starts, repeated years and suspension of studies. A small proportion of students were still enrolled at this point and were classified as 'not completing' for this analysis; this was necessary as the original data specification did not provide a reliable way of distinguishing this group between institutions. Students receiving an interim sub-degree award were included as 'completing', although they might more appropriately have coded as 'not completing' in retrospect.
- *Attainment of 'good' degree* (2009 cohort): two separate definitions were used for this variable: (i) obtaining a first class degree, and (ii) obtaining a first class or upper second class degree. A small minority of degrees not leading to a standard classification were coded as 'missing' for the basis of this analysis, as were students receiving an interim sub-degree award.
- *The DLHE 'successful outcome' metric – in graduate level work or future study six months after graduation* (2009 cohort): Although this is seen as somewhat problematic in terms of validity, it has an established sector-wide currency in terms of assessing employability. Needless to say, this measure was only available for those students completing within five years, while a proportion of students within the DLHE sample were coded as missing if they had chosen not to enter the labour market (e.g. raising a family or travelling). The remainder were coded as either having a positive or negative outcome.

Control variables

After various discussions within the research team, 14 control variables were agreed for entry into the model as outlined in the table below. In addition, a dichotomous dummy variable for the achievement of a first class or upper second class degree was added as a control variable for the analysis of graduate employment outcomes.

Variable and associated HESA fields (as relevant)	Definitional notes
Entry qualifications EP_USE.QUALENT3 XTARIFF	<p>A nine-way categorical variable was constructed from the two HESA data fields:</p> <ul style="list-style-type: none"> • Top quartile A Levels / International Baccalaureate tariff • Upper middle quartile A Levels / International Baccalaureate tariff • Lower middle quartile A Levels / International Baccalaureate tariff • Bottom quartile A Levels / International Baccalaureate tariff • A Level / International Baccalaureate – tariff unknown • Access to Higher Education course • Other Level 3 vocational qualifications (BTEC/EDEXCEL etc.) • Previous sub-degree HE qualification • Other qualifications / experience <p>The tariff data was only felt to be acceptably valid for A Levels and International Baccalaureates, so by taking quartiles it was possible to create meaningful categories while preserving most of the detail. Tariff data for vocational qualifications was not felt to be acceptably valid, especially where combined with A Levels. Needless to say, the quartile boundaries varied substantially between institutions. <u>Note:</u> these data were seen as particularly problematic by institutions in terms of their reliability, especially where students presented a mixture of ‘academic’ and ‘vocational’ qualifications. Nevertheless, they were the most readily available and a vital inclusion in the model due to the explanatory power of entry qualifications in student outcomes.</p>
Academic subject JACS1 JACS2 JACS3 JACS1_FTE JACS2_FTE JACS3_FTE	<p>A 20-way categorical variable was constructed from the six HESA data fields. Nineteen of these represent the JACS2 categories, with an additional ‘Combined’ category (see below); the new ‘1’ code for computer sciences was not used as it was not uniformly implemented across the five institutions. An algorithm was used to allocate students with multiple JACS codes to a single category:</p> <ul style="list-style-type: none"> • Over 50% in any one JACS code = that code • 50% each in two identical JACS codes = that code • 50% each in two different JACS codes = ‘combined’ code • 33% each across three identical JACS codes = that code • 33% each across two different JACS codes = code with two entries • 33% each across three different JACS codes = ‘combined’ code <p>In other words, students were allocated to the dominant JACS code where one existed, or to a combined code where the codes were balanced equally.</p>
Sex Student.SEXID	<p>Effectively a binary variable – a third option was available in 2012, but no students were entered against it in the five datasets.</p>

<p>Disability Student.DISABLE Instance.DISABLE</p>	<p>A three-way categorical variable was constructed from the two HESA data fields:</p> <ul style="list-style-type: none"> • Not known to be disabled • Disabled, and in receipt of a Disabled Students Allowance (DSA) • Disabled, and not in receipt of a DSA <p>A full problematisation of this variable is beyond the scope of this project, but the third category tended to include higher proportions of students with unseen disabilities and long-term health conditions. There may be some scope to explore explanatory power of particular disabilities, but, in general, the numbers within each category are too small to permit reliable inference.</p>
<p>Ethnicity Student.ETHNIC</p>	<p>A 10-way categorical variable was constructed from the HESA data field to ensure sufficient numbers in each grouping for analysis:</p> <ul style="list-style-type: none"> • White • Black Caribbean • Black African • Indian • Pakistani • Bangladeshi • Chinese • Mixed ethnicity • Other ethnicity • Unknown ethnicity
<p>Age on entry Student.BRTHDATE</p>	<p>Derived from the HESA data field and then categorised into a four-way variable:</p> <ul style="list-style-type: none"> • Under 21 • 21 to 24 • 25 to 29 • 30 and over
<p>Accommodation type Student.TTACCOM</p>	<p>Directly following the HESA data field categories. The research team feel that this particular variable is unreliable, but it provides the best available measure of a student's housing type in their first year and at least acts as proxy to identify those students (a) living with their parents, and (b) maintaining their own home while in HE, which may indicate caring responsibilities.</p>
<p>Industry year Instance.LOCSY</p>	<p>Derived dichotomous variable (1 = Yes) as to whether student had a year in industry or on placement within their degree.</p>
<p>Study abroad year Instance.LOCSY</p>	<p>Derived dichotomous variable (1 = Yes) as to whether student had a year studying abroad within their degree.</p>
<p>HE participation rate of home area EP_USE.POSTCODE</p>	<p>Categorised into ordinal POLAR3 quintiles using home postcode, with 1 = lowest youth HE participation rate.</p>
<p>Distance from home</p>	<p>Continuous variable, calculated in miles from student's home (pre-HE) postcode to main institutional campus, by converting postcodes to grid</p>

to HEI EP_USE.POSTCODE	co-ordinates and using Pythagoras' theorem.
Programme size	Continuous variable comprising the total number of students on the student's programme, not just those within the dataset – i.e. including international students and non-English UK students.
Partnership or franchise course	Dichotomous variable (1 = Yes) as to whether student's programme is delivered by another organisation – i.e. a franchised course.
NSS rating	Continuous variable comprising overall National Student Survey satisfaction rating as a proxy for programme quality. For convenience (as this was time-consuming to operationalise), the 2014 figure was used throughout with the university average used for missing values (e.g. for small or new programmes). The source data was linked via the KIS course code.

Ongoing issues for resolution

There are a number of issues that require resolution - partly during the piloting phase with a further five institutions in Phase Two - before the model can be recommended for use across the sector:

- Different approaches have been taken by institutions to account for the partial coverage of NSS data – e.g. for new or small programmes. A unified approach is required looking ahead, probably by using the institutional mean to replace missing values.
- The categorisation of entry qualifications needs more focused attention given changes to the UCAS tariff and a broadening of qualifications that institutions (particularly post-1992 institutions) are willing to accept.
- As noted above, institutions are using very different approaches to defining retention at the micro level, leading to withdrawal rates that are substantially different (both higher and lower) to those published through HESA. While this is primarily an issue of what metric the institution wishes to use to understand its student body, this has implications for comparability between institutions and makes a consolidated analysis very problematic.
- Similarly, more discussion is needed of the concept of completion in light of the awarding of interim qualifications for students completing full years of study. This practice is more widespread in some institutions than others and a view needs to be taken as to whether this constitutes a 'completion' or not.
- While resolved within this stage, for the piloting and implementation stages it will be important to reinforce the difference within the UCAS tariff and HI fields between missing data and zeros as these are easily conflated when capturing data from institutional databases.
- Additional outcome measures may be needed for institutions that have very low withdrawal/non-completion rates or very high rates of achieving good

degrees and graduate employment. As is generally the case with regression models, significant differences become more difficult to evidence and interpret when the outcome measure is very high/low.

- It is important to remember that any relationship between HI and outcome variables may not be linear. There is the potential for a fallacious 'common sense' assumption that students from ever more affluent backgrounds are more likely to achieve highly due to the material support that they or their families are able to employ. However, it may be that this only holds up to a certain point where motivational factors rather than financial ones become more relevant in determining the behaviour of higher income groups. In order to overcome this, HI has been converted into categorical data within the model.

Institutional challenges

One of the practical findings from Phase One has been that institutions have significant challenges in capturing and manipulating the data needed for the specified analysis. There are several reasons for this:

- Capacity within data management teams is not even across the course of the year, with 'pinch points' that limit the ability of key staff to engage with the process. The summer vacation was found not to be ideal for this project, partly due to the short timescales and multi-institutional nature. In the future, individual institutions will need to determine when in the year is optimal for the analysis to be scheduled – this may vary from institution to institution.
- In several of the institutions, the data on bursary allocations are held in different databases to those holding student details and outcomes, requiring new matching processes to enable complete records to be formed. These problems were unique to individual institutions, given the 'home-grown' nature of the databases used.
- More generally, the databases used by institutions were not optimal, generating data in differing formats and making inter-institutional comparisons problematic. In order to overcome this, a series of coding decisions were taken by the project team. These will be explained in more depth in an institutional analysis guide that will be produced in early 2016.
- Some of the data required for this project are not routinely used by data management teams as part of their mainstream internal analysis activities, with the result that some had to engage with unfamiliar data definitions and calculations (e.g. distance from home postcode). This also hampered the quality assurance of the data captured. Again, the institution guide will provide advice on the specific definitions used and their rationale.
- One of the institutions had difficulties in securing access to sensitive personal data on students for analysis due to internal data protection rules; this was eventually overcome with appropriate assurances about security and non-disclosure, but it may emerge in other institutions.

- There were some difficulties caused in the transmission of institutional sign-up to the project from senior managers to operational staff, where the former were enthusiastic to be involved, but the latter were constrained by the time available in the context of other responsibilities. This highlights the need for engagement at all levels for satisfactory adoption within an institution.
- The specification of historic bursary allocation criteria and procedures was sometimes unavailable or incompatible with the data captured on individual bursary allocations (e.g. one HI threshold income was specified, but many students over this threshold had received bursaries). This is more challenging for the five-year analysis due to the passage of time. Institutions will need to consider how this historic information is archived or which individual staff have access to it.
- Within the timescale and resources available to the project, it was not possible to thoroughly quality assure and problematise the data captured by institutional staff; issues arising are explored in the previous section. Resolving these definitional issues remains a key issue of validity for analysis and, importantly, this can often only be achieved through comparing data between institutions.

Conclusion

Phase One of the project successfully developed and implemented a working statistical model for assessing the impact of student bursaries. This was achieved using data that are (in most cases) readily-available within institutions and a statistical technique that is easily implemented using common desktop software.

The model will need further refinement and possibly simplification after the pilot phase and before it is rolled-out for adoption across the sector, especially given the definitional and operational issues outlined above. The ease of adoption is likely to be influenced by the existing data management infrastructure within institutions and their capacity for academically-led and critical statistical analysis.

As a side product of the project, it is likely that the analysis of student outcomes was the most rigorous undertaken in the five institutions to date, with significant opportunities for the institutions to examine other aspects of the student experience within the context of a uniquely detailed dataset.

Finally, the issues of epistemology raised towards the start of this report remain of paramount importance. Without a clear framework for understanding the results generated by the model, there is a risk of making faulty inference about the impact (or not) of bursaries. Specifically, expecting bursaries to make student from low income households have significantly stronger outcomes than relatively advantaged students is a very high (and probably unrealistic) bar for proof of effectiveness. Essentially it will be up to institutions that use the tools developed in the project to decide on their own definition of effectiveness. Furthermore, the nature of inference statistics is such that institutions will be well-advised to examine at least two sequential years of data in order to examine the stability of findings over time and to reduce the risk of acting on 'false positives/negatives'.

Next stage: Phase Two

In discussion with OFFA it was agreed to identify five other pilot institutions to test the statistical model in the same way (i.e. using 2009-10 and 2012-13 data) once the model has been refined following the feedback from this current report. This will enable the research team to test the model in a wider, more representative range of institution types and reduce the association of the model with the five partner institutions leading the research. Phase Two pilot institutions have been specifically selected to broaden the range of institutional contexts, taking into consideration several potential key variables that may impact on the type of financial support packages offered and their likelihood to persist in higher education: characteristics of student body (e.g. according to institutional mission); geographic (e.g. rural isolation may impact students living large distances from institution; regional variations; institutions with high levels of ethnic diversity); market competition (e.g. the London effect with large numbers of alternative providers). The five institutions chosen are:

- University of York
- University of Winchester
- University of East London
- Falmouth University
- Royal Agricultural University.

It is also recommended that OFFA should explore the scope for a third party organisation to undertake the analysis on behalf of institutions in the long run. This would provide opportunities for centralising expertise, comparing results and developing a national oversight around the impact of student bursaries.

Phase Two of the research also includes a set of survey and interview tools that will enable institutions to gauge the effectiveness of their specific financial support packages, adding more fine grained analysis of how individual recipients use and value support offered as part of access agreement expenditure. These tools will be accompanied by recommendations that they are used systematically and repeated over time in order to develop a long run and potentially comparative analysis that will add to the sector's understanding of the impact of institutional financial support on student success.

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