

LONDON'S GLOBAL UNIVERSITY



**UCL**



**2022 – 2027**  
**Strategic Plan consultation**

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# **UCL's size and shape**

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# Introduction

This paper is the last in a series of seven surveying our current position and setting out possible research, education and enabling initiatives for inclusion in our Strategic Plan 2022-27.

The rich and detailed feedback we have received on those papers has brought forward new ideas for improvements to the student experience, suggestions for new academic initiatives, and proposals for the development of our pedagogies. Those ideas will be reflected in the final Strategic Plan, which is now in the drafting stages and will be published as a draft for full community consultation in October.

Since this consultation started in 2021, our external operating environment has changed unexpectedly and dramatically. The rapid ending of COVID-19 pandemic restrictions; a war in Europe creating many economic and social effects; a period of significant and continuing inflation; the freezing of the home undergraduate fee for three years; failure to agree accession to the Horizon Europe research funding programmes; changes in our political environment. These have together created significant volatility and uncertainty. Consider the impact of rising inflation alone. Inflation has increased<sup>1</sup> from 3.1% in September 2021 to 9.4% in June 2022, more than tripling to reach its highest level in forty years. It is expected to rise still higher during the period of our consultation and remain elevated for some time. This is already placing unprecedented financial stress on our students, staff and the entire higher education sector in the UK, which will worsen if no action is taken. These major changes in our operating environment compel a change in this paper, outlined in the following section. In particular, the focus of this paper will be on 'size' rather than 'shape', and for the purposes of modelling our current shape will be held constant.

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<sup>1</sup> <https://www.ons.gov.uk/economy/inflationandpriceindices/bulletins/consumerpriceinflation/june2022>

# Size and the parameters of shape

The size of a university is primarily, though not exclusively, a function of the number of students that it teaches. The number of staff employed in each institution is a function of student numbers and varies according to the available revenue sources. For UCL, student fee revenue is our primary source of discretionary income. Therefore, the size of the institution is very closely tied to the number of students that we teach. That relationship will be the focus of this paper.

For an institution of any size, its shape depends on five different variables: disciplinary mix; ratio of undergraduate to postgraduate students; ratio of home to overseas students; ratio of on-campus to online students; and ratio of award to non-award students.

There have been changes to each of these five aspects of the shape of our student body over the preceding decade, but the current uncertain conditions do not enable an extended discussion of potential changes to these variables. Thus, in this paper it is assumed these will be kept constant for at least the first half of the strategic period, 2022-27. Discussion paper five, *Education priorities and programmes*, proposed pilots of new online provision, and this paper is intended in part to test the appetite of our community for exploring greater growth in this area. But consultation on whether changes are desirable in any of the first three, major variables in the shape of our student body (disciplinary mix, undergraduate and postgraduate, home and overseas) will be reserved for the second half of the Strategic Plan. Any changes identified as necessary will be considered for implementation as part of the following Strategic Plan. That consultation will include consideration of UCL East, where Phase 1 will have opened, and the potential for Phase 2 in the longer term up to 2037. Given the uncertainty in the external climate, we judge that overall size should be discussed before considering these possibilities.

# A focus on student numbers

As our collective institutional aspirations are brought into a prioritised, multi-year plan, it is important to explain why particular options have been adopted where others have not.

In the current economic climate, financial constraints have the most significant impact. As much of our income, such as that from research grants, is ring-fenced for specific purposes, our main source of discretionary income comes from student fees. This means both that the needs and ambitions of students must have a high profile in our plan and in our investment decisions, and that the way we derive our student income over the next five years is a pivotal question with implications for the full range of our activity. This paper therefore explores the relationship between the size of the student population and the opportunities we can create for our academic ambitions across education, research and enabling activities.

UCL has now grown to become the second largest higher education provider in the UK, with over 47,000 students enrolled in 2021-22. *UCL Now* considered the historical reasons for this growth and its consequences, both good and bad. Some of this change was planned over time, and some of it has happened organically, including in response to external factors, such as the pandemic. Shifts might come about through a change in the balance of home and overseas students enrolled in programmes, or where postgraduate recruitment is prioritised over undergraduate in particular disciplines. Changes in the delivery of education – for example, where shifts in a discipline lead to a greater demand for wet lab bench space – can also affect the deployment of fees income at a local level. Small changes at programme level, aggregated across the university, can have a major effect over the long-term, and so the interplay of various factors must be explored (including the size of the student population, our staff base, our research activities and our use of campus), so we can best use this income to realise our ambitions for our academic mission.

# Considering different trade-offs

The income and expenditure from our teaching activities combines with income and expenditure from research plus other sources of income and expenditure to create our overall operating margin. Every institution needs, as a minimum, to break even or to make a positive operating margin so that it can continue to invest in its people and infrastructure.

The size of our student population has financial consequences for the operating margin that supports our financial sustainability. Student tuition fees are our largest source of income. However, it is not straightforward to extrapolate changes in the size of our student population into changes in overall income. This is because the size of our student population not only reflects the diversity and breadth of disciplinary education we can provide (considered in the paper *Education priorities and programmes*) but also creates differing income and expenditure for each course. For example, some courses cost more than others even if they generate the same amount of income, while other courses have similar costs but generate different amounts of income due to the variables within their student populations. Thus changes in the size of the institution have complex effects on both income and expenditure.

To help understand this, we can calculate the gap (known as a marginal cost or marginal benefit) between income and expenditure for each type of course that we offer. This gap not only differs for undergraduate and postgraduate teaching, but across all types of activity including research. Such variation is consistent across research-intensive universities in the UK and reflects structural choices in the UK system about how research and teaching are funded (see Appendix 1 for a much more detailed analysis).

The consequences of this variability are that the size of the student body, and the difference between our income and expenditure, cannot be considered entirely in isolation. Some key additional factors that are relevant to consider include:

- *The number of staff.* The larger the student body, the more academic and professional services staff we need if we are to retain a constant staff-student ratio and to maintain the level of professional services support we offer students.
- *The volume and disciplinary mix of research.* Our research portfolio mix primarily reflects the academic excellence of our academic staff and their success in applying for funding that meets their needs. However, some of the surplus from teaching is needed to cross-subsidise our losses on publicly funded research. The amount of research that can be cross-subsidised in this way, and the disciplinary research mix (as different research disciplines have different needs), are directly related to the size of the student body, and most particularly to the amount of income we receive from non-UK students. In addition, the number of postgraduate students we teach impacts the number of research projects we can run.
- *Space utilisation.* The more students we teach, the more teaching and learning and student study space we need. Particular disciplines require specialised practical- or practice-based space; and postgraduate and undergraduate needs differ.

These factors – and the broader issues around university finance in the UK – are explored further in Appendix 1. For the purposes of this paper and its specific focus on student numbers, they indicate that the size of our student population must be balanced against the volume of research activity and staff numbers that can be supported (and vice-versa).

# A high-level model for our size and shape

The intellectual, reputational, and financial sustainability of a university is dependent upon its revenue and its capacity to invest in quality research and education.

As a research-intensive university, attempting to maintain reasonable staff-student ratios, with an aging estate and located centrally in one of the most expensive cities in the world, UCL has a much higher cost base than most UK universities. Our assumption is that maximising our revenue from student fees is desirable, as long as it is practicable; ethical; compatible with our role as a UK higher education provider in a fee-capped domestic market; and consistent with maintaining both access and a high-quality student experience. To do so produces more resources that can be invested in salaries and scholarships, physical and digital infrastructure and, in other ways, in education and research.

As part of the strategic plan consultation, we have developed a high-level Size and Shape model for UCL that has been validated against our internal data by an academic and professional services team. The model provides estimates of the marginal income for each broad category of educational programme and estimates of the marginal income associated with research in corresponding disciplines. The term “marginal benefit” is used in this paper to refer to the difference between income and expenditure on an activity. A negative marginal benefit means the activity will cost more to deliver than the income it will generate, although, of course, the university will want to maintain such activity where it is academically important.

This model and its outputs focus on teaching and research income and expenditure, which is only a partial view of UCL's activity. It is necessarily limited in scope and execution, and certain assumptions have been made to increase the ease with which different combinations of the variables described in this paper can be adjusted. One assumption is, at least for the present, maintaining our current disciplinary mix. Other assumptions, and the scope of the model itself, are noted in the technical appendix to this paper.

The model excludes the various incomes and expenditures that one would expect to find within a financial model of the type used to plan for UCL's longer term financial sustainability. A financial model would, for example, model the potential effects of financial shocks and the predicted impact of increased inflation on our operating costs over time. In contrast, the high level model described here cannot be used to answer detailed financial questions, nor can it provide precise information about the overall operating margin. However, its simplicity makes it easy to check the feasibility of certain teaching and research scenarios, and how they compare to one another.

The model shows that in general our publicly funded teaching breaks even or makes a small surplus after costs are considered; non-publicly funded teaching of overseas students makes a moderate surplus after costs are considered; and research makes a moderate loss after costs are considered. These marginal benefits for teaching are described in Figure 2 below.

The validation group has examined these figures and the underlying calculations and found them to be sound. Importantly, the qualitative and relative positioning of UCL's publicly and non-publicly funded research in terms of its marginal benefit is consistent with public data, such as that from the National Audit Office shown in Appendix 1, which shows that publicly funded teaching of home students and publicly funded research cost more to provide than they generate in income, while the opposite is true for teaching of overseas students.

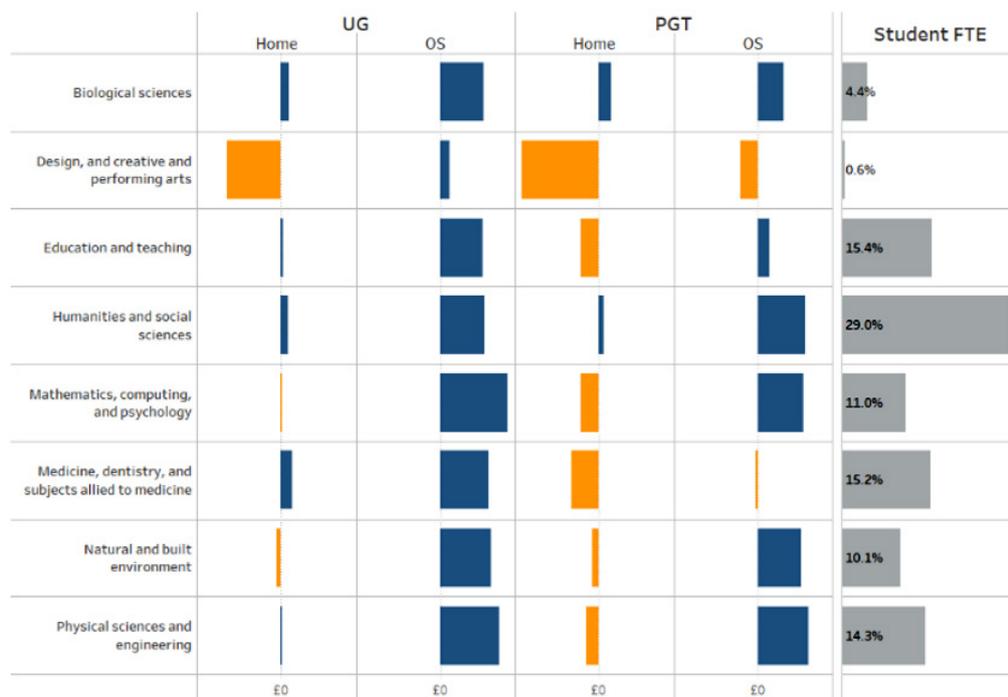


Figure 1: High level model calculations of the relative marginal cost (yellow, to the left of the break even line) or benefit (blue, to the right of the break even line) of different courses at UCL, grouped by HeCOS codes and for different student groups. The right hand column shows student FTE associated with each HeCOS code group. All figures have been confirmed as accurate given the assumptions of the high level model by the Technical Validation Group. Data from 2019 (i.e. pre-pandemic).

One important limitation of the model is that the quality of the data about our estate is not currently sufficient to include the entirety of our space costs in the calculations. Some of the space costs in TRAC<sup>2</sup> (see technical appendix) are used as they are reasonable proxies, but this does not tell the complete story about how we use our estate, and what it costs. This is an important gap, as it means we cannot yet fully link the costs of space utilised by research and teaching activity to the income and expenditure incurred by that activity. It also means we cannot accurately judge how improving the space efficiency of our estate might improve our operating margin. However, the validation group judged it inappropriate at this stage to include such data until the quality improves. Generation and inclusion of such data is expected as part of the estates master planning process outlined in *Enabling our academic mission* (discussion paper six) and should be prioritised as part of the Strategic Plan 2022-27.

Despite the limitations of our space data, the marginal cost of teaching activity and the research deficit can still be estimated at a high level, thereby indicating which scenarios will be more likely to help us towards financial sustainability.

Finally, another important limitation of this model is that it does not examine all possible ways in which the marginal cost of teaching and research can be varied. For example, the development of a specialised online teaching portfolio is one way of increasing the marginal benefit of teaching, should the income received significantly exceed the costs of delivery. Similarly, increasing commercial and entrepreneurial activity could increase the marginal return of research. And philanthropy could provide restricted and unrestricted sources of income for new investment. However, none of these are major sources of income or cost at present, and so we must focus on the major sources of income and cost: research and teaching.

Using this high-level model, we can examine the relative marginal benefit of adopting different size scenarios. This will help us to understand the relative feasibility of various scenarios and therefore which of them may be worth taking forward for fuller financial modelling. In the next section of the paper, we examine some of these scenarios to see their effects. For each scenario, we make several modelling assumptions and examine the marginal cost in steady state after several years.

# Modelling different scenarios for UCL's future size

A high-level model can examine many potential variations on future size. To keep this paper tractable and to prompt feedback and discussion, here we examine a baseline scenario and a further four contrasting scenarios. Initially, we consider the **baseline**, in which we assume that current organic growth will continue through 2027 without any of the major academic initiatives discussed in paper four, *Academic opportunities for targeted investment*. Given the positive feedback on many of the initiatives proposed in that paper, and additional feedback suggesting many more potential academic initiatives, this scenario might appear unrealistic. However, it allows us to examine the implications of simply standing still.

The second scenario examines the possibility of **significantly reducing our student numbers**, a possibility that has been mentioned in our Academic Board and other settings. This may be exceptionally difficult given the importance of our comprehensive nature and the strong demand for our high-quality teaching and learning. However, it illustrates the potential challenges of reduced tuition fee income and, specifically, the impact on our ability to conduct high quality research and invest in our people and infrastructure

A third scenario then examines the possibility of **slightly reducing our student numbers** to a level comparable to a few years ago pre-pandemic. This reduction may still be difficult given the current inflationary environment but also illustrates the potential consequences of smaller reductions in our tuition fee income for our academic ambitions.

We then examine the contrasting scenario of a **large increase in student numbers and associated research activity** that accommodates many (perhaps all) of the initiatives set out in paper four, *Academic opportunities for targeted investment*. Lastly, the final scenario examines a perhaps more likely approach where some of the *academic opportunities for targeted investment* are selected for investment, leading to an **increase in growth above our current long-term trend**.

We compare each scenario outcome to the others, relative to the baseline scenario. This is to make clear that outputs cannot be used to make financial

decisions, or to evidence financial sustainability: to do that we would need to carry out full and comprehensive financial modelling that incorporates many more factors than are included in the model. Student full-time equivalent (FTE) figures are for taught students only, excluding Initial Teacher Education and postgraduate research students. For those interested in understanding student headcount, a conversion factor based on assumed part-time participation is given in Appendix 2. Staff figures are not total staff headcount, but FTEs for those core-funded staff primarily involved in delivering teaching, performing research, or supporting students, plus central professional services (PS).

## Scenario 0: current situation

The baseline student FTE is based on the latest Student Number Planning targets provided by faculties, including planned UCL East growth. This is predicted to deliver in 2027 a taught student population of around 39,500 FTE (compared to 34,467 in 2019, the most recent completed typical year), associated staff numbers of around 5,006 FTE (compared to 4,410), and a research volume of £570M (compared to £503M). We will set the marginal benefit produced by this baseline scenario to the arbitrary value of 100, so we can compare any increase (or decrease) in marginal benefit against this standardised figure.

Using the model, we can now examine how variations in the parameters described earlier in this paper will affect the teaching and research marginal income we will achieve in 2027. For example, changing the unregulated fee income by +10% increases the marginal benefit by +17%, all other things being equal. Similarly increasing non-research space efficiency by 10% increases the marginal benefit by +4%. Systematic examination of these parameters, not shown in this paper, shows that apart from student numbers themselves, the parameters that have the biggest influence on the margin are those influencing cost recovery: improving research Full Economic Costing (FEC) recovery, reducing the amount of research we do, increasing unregulated tuition fees or improving space efficiency.

The baseline scenario therefore suggests that to maximise our ability to invest in our staff and students we should particularly direct efforts towards:

- improving research cost recovery
- inflation-appropriate increases in unregulated tuition fees
- ensuring teaching space is used efficiently

We should take these actions regardless of what our future policy on size and shape of the student population is determined to be over the next five years.

We cannot quantitatively compare the outputs of this high-level model with a full financial model. This is because a full financial model includes detailed consideration of all funding streams, rather than just research and education, and incorporates very detailed predictions of factors such as inflation. However, we can say that the currently planned operating margin is insufficient to deliver all the academic aspirations already outlined in the strategic plan consultation, particularly during a period likely to be characterised by high inflation and potential financial shocks. Should we wish to afford these and be financially resilient, alternate scenarios will be required to generate significantly higher marginal benefit.

### Scenario 1: substantially smaller

In this scenario we modelled a reduction in the number of students to 25,000 FTE (please see Appendix 2 for the assumed multiplier to convert this figure into headcount) under the assumption that we wish to retain all staff from scenario 0. This leads to two major changes. The fall in teaching income that results from such a scenario means that UCL would be unable to sustain the same volume of research activity. The model suggests that externally funded research income would fall by 37% compared to the baseline scenario. To put this in context, this would be equivalent to losing the entire combined research income of the Faculty of Engineering Sciences and the Faculty of the Built Environment.

The second major change in such a scenario would be a significant **fall in the UCL marginal benefit of 55%**. This would now provide insufficient operating margin to deliver the current ten-year backlog in maintenance (estimated at £600M) or any new investment in academic activities and new buildings. Nor could we afford any of the activities proposed in the *Academic priorities for targeted investment* paper or the additional academic opportunities proposed in the extensive feedback received. Such a dramatic

reduction in size would also potentially rule out the development of UCL East Phase 2, an important component of our current agreed long-term strategic ambitions.

This scenario does not make any assumptions about how such a large reduction in student numbers could be achieved or which disciplines might be affected. Putting into practice a cap or reduction in numbers would require specification of the discipline or disciplines in which such reductions were to be achieved. If such a specification identified only a small number of disciplines to be reduced in size, then the proportionate reduction to achieve the overall scenario target would be much greater. Similarly, because our undergraduate students spend more than one year at UCL, to achieve a steady state reduction rapidly would require a much larger proportionate cut in recruitment initially. Achieving either of these aims would be particularly challenging.

Major cost savings could mitigate some of the unpalatable consequences of this scenario on research and marginal benefit but would create profound difficulties of their own. For example, we might contemplate reducing our staff proportionate to the reduction in student numbers. However, this reduction of 1,300 staff would be equivalent in numerical terms to closing our nine largest departments. Not only would such a change be extraordinarily challenging, but it would also be considered by many as indefensible without a clearly documented and agreed rationale for reducing student and staff numbers. Both the change in research volumes and such a major reduction in staff would also challenge our commitment to being a comprehensive university committed to preserving and sustaining all its disciplines.

More realistically, we could mitigate the consequences of a reduction in student numbers by reducing space usage and increasing unregulated fees. For example, if teaching and PS staff space usage could be reduced by 20% (a dramatic decrease) and unregulated fees increased by 20%, the marginal benefit would now fall by only 28%. This may be sufficient to address the maintenance backlog and some modest investment in academic activities but would almost certainly be insufficient to undertake any major estates projects such as those proposed in *Academic priorities for targeted investment* or in feedback. Indeed, to deliver a marginal benefit roughly equivalent even to our 2019 operating margin in such a scenario, the model suggests we would also need to shrink our research volume by 13% in addition to reducing our space usage by 45% and increasing our unregulated fees by 38%. These are not realistically achievable figures.

## Scenario 2: slightly smaller

In this scenario we modelled a reduction in the number of students to 32,500 FTE under the assumption that we wish to retain all staff in the baseline. This leads to two major changes. The fall in teaching income that results from such a scenario means that UCL would be unable to support the same volume of research activity. The model suggests that externally funded research income would need to fall by around 21% or just over £130M compared to scenario 0. To put this in context, this would be equivalent to losing the entire research income of the Faculty of Brain Sciences in the most recent completed academic year.

The second change in such a scenario would be a significant **fall in the UCL marginal benefit of 28%**. As with scenarios where there was major reduction in size, even a smaller reduction in size would still provide insufficient operating margin to deliver the current ten-year backlog in maintenance (estimated at £600M) or any new investment in academic activities and new buildings. Nor could we afford any of the activities proposed in the *Academic priorities for targeted investment* paper and in the extensive feedback received proposing additional academic opportunities.

As with Scenario 1, achieving reductions in student numbers would be challenging in practice because of the need to cap or reduce numbers in particular specialties. While the reductions considered in Scenario 2 would not be as challenging as in Scenario 1, nevertheless the current academic plans submitted by Faculties as part of student planning do not currently propose any reductions in student numbers in any Faculty over the period of the Strategic Plan 2022-2027. Achieving this level of reduction would therefore require major alteration to established academic plans, even before consideration of the initiatives put forward in the consultation papers and in feedback from the academic community.

Once again, some of the negative effects of this reduction could potentially be offset by increasing efficiency in use of the estate and increasing the level of unregulated fees by 10% respectively, while scaling staff numbers down with student numbers (a reduction of around 340 staff) However, these changes would still not wholly offset the loss of income arising from even a relatively modest reduction in student numbers, nor would they mitigate the increased pressure that would be placed on other aspects of UCL's overall financial model.

## Scenario 3: substantially larger

In this scenario we examine the consequences of planning for a large number of academic initiatives such as those proposed in feedback received and in *Academic priorities for targeted investment*. Without detailed business cases (which we are not able to draw on at this stage) this is necessarily imprecise, but for the purposes of illustration we assume that these might lead to an increase in academic, research and professional services staff to around 7,000 by 2027. If we further assume that our overall staff/student ratio (currently one of the lowest in the Russell Group) remains constant, then this would be associated with a student population that increased by 16,000 FTE to 55,000 FTE.

The high-level model shows that this substantial increase in size also leads to a **rise in marginal benefit of +45%** on scenario 0, our current trajectory. This would also support a significantly higher externally funded research volume (+40% or £229M on scenario 0). However, this improved marginal benefit would also have to support the significantly increased digital and physical investment needed to teach and support a much larger student population and greater research volume. Moreover, that investment would be needed now, before the student population rose by such a substantial margin to the modelled 2027 levels.

This modelling suggests that the marginal benefit generated by a substantial increase in size could not sustain the significant capital investment required while also providing resilience to the financial shocks that may characterise the next period and funding investment in the academic priorities identified in the strategic plan consultation. In this scenario of larger student numbers, we might also anticipate that lack of investment would lead to deteriorating estate and student experience, with their accompanying risks to the quality of both our research and education and our student and staff experience.

Varying tuition fee income and the efficiency of teaching and professional services space also makes an impact in this scenario. For example, if we can additionally improve space efficiency by 10% and increase unregulated fees by 10%, this will now generate a marginal benefit of +74% on scenario 0 before any additional capital requirements are considered. However, it is unrealistic that we could both reduce the current teaching and learning space by ten percent **and** increase student numbers by 16,000 FTE.

This scenario poses challenges that are not seen with Scenarios 1 and 2. For example, planning to recruit additional staff and students leads to additional environmental sustainability challenges that, if not addressed, would be in conflict with our commitments in this area. This in turn may lead to unacknowledged financial and other costs associated with such a scenario.

## Scenario 4: slightly larger

Scenario 3 assumes that all academic initiatives put forward either in the earlier discussion papers or as part of the feedback on the Strategic Plan are of equal value and will be implemented. Not only does the model show that this is likely to be unaffordable, but also it does not reflect the reality of consultation, academic debate and prioritisation that will inevitably happen, and that have been endorsed in the strategic plan consultation to date.

We therefore examine a fourth scenario in which a smaller selection of the academic initiatives is selected for investment - the exact mix of these is yet to be determined, using the processes and approaches for academic prioritisation described in the strategic plan consultation to date – and we increase student numbers more quickly than the current planned growth, but not reaching the substantially larger 55,000 student population outlined in scenario 2.

This scenario suggests, by 2027, an overall student population of 47,400 FTE with research volume of £687M, producing a **rise in marginal benefit of +23%** compared to scenario 0. This is based on an assumed 8,000 extra student FTE, associated growth of around 1,000 extra staff FTE (compared to 2019 estimates of planned growth to 2027), and a 20% increase in externally funded research volumes (sustaining the ratio of time and level of investment spent to subsidise research at 2019 levels).

As with other scenarios, we can also examine the effect of changing the efficiency with which we use teaching and professional services space and the amount of unregulated fees. Reducing space utilisation by 10% and increasing unregulated fees by 10% change the marginal benefit to +48%, the equivalent of 8,000 extra students.

While this scenario does deliver a significant increase in our capacity to support teaching and research, the changes in marginal benefit are still likely to be insufficient to support an increased teaching estate, modest investment in the academic priorities proposed in the consultation and significant investment in the maintenance backlog of our estate.

# Comparison of modelling different scenarios

The different scenarios (without the sensitivity analyses presented above) are summarised in the chart and table below.

Chart 1 shows the **relative marginal benefit** of each of the four size and shape scenarios modelled. Scenario zero is the baseline projection to 2027 based on the current trajectory and has been indexed to 100. The marginal benefit of each of the further four scenarios is presented relative to this index.

In each scenario, the marginal benefit appears to grow too slowly to keep pace with that scenario's academic and capital needs, especially considering that the impacts of rising inflation and the estate maintenance backlog are not modelled. In a full financial model, we also need to accommodate the possibility of sudden financial shocks, for example those associated with prolonged high inflation or an unexpected inability for international students to come to the UK.

This therefore indicates that expanding our current teaching activities is not likely on its own to be enough to remain financially sustainable and realise the academic ambitions set out in this strategic consultation. We should also note that in the current political environment it appears extremely unlikely that the UK government will restore capital grants to universities or provide revenue support. We therefore can conclude that additional sources of cost saving or income generation, some of which we have begun to outline in paper six, *Enabling our academic mission*, will be required under any future high-level scenario.

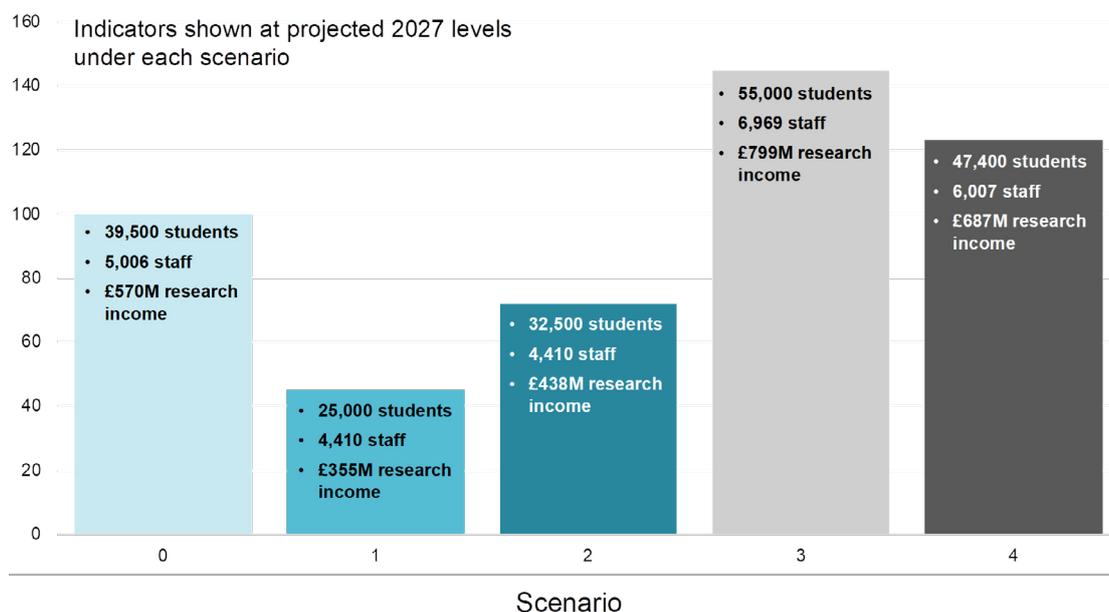


Chart 1: Relative marginal benefit of the size and shape scenarios, indexed to the baseline (Scenario 0). Figures for student numbers are FTE as described in the text.

# Modality of teaching delivery

In addition to cost savings, it would be prudent to prioritise sources of income that do not place such a burden on our teaching estate that is currently limited in capacity, particularly following the recent expansion of student numbers in 2020/21 and 2021/22. Some of this income may come from philanthropy, additional commercial income, entrepreneurship, or changes in the research portfolio. It could also come from a significant expansion of our online teaching provision to deliver a portfolio of courses that complement (rather than compete with) our face-to-face provision.

This expansion could generate relatively high marginal income while not further taxing our estate. However, it would likely require some significant initial investment in digital infrastructure to present a high-quality pedagogical opportunity. This investment would likely require 'up front' capital investment in a high-quality platform, a clear target market that could align with our priorities such as widening access to citizens of the global south, and clarity of which type of educational opportunity (undergraduate, postgraduate or executive education) we were targeting. This is because success is unlikely to come from attempting to serve all target markets at the same time across all types of opportunity.

Such detailed considerations are beyond the scope of this paper, but were also raised in paper five, *Education priorities and programmes*. Paper five explicitly considered digital and online expectations and possibilities and tentatively identified a market for flexible learning and whole career continuing education, delivered online and offered by institutions with high academic reputation and rigour. Currently we deliver 61,314 learner days<sup>3</sup> of continuing professional development, a significant proportion of which is provided through online or blended methods. However, the platform that provides these courses is relatively unsophisticated and we lack micro-credentialing or other features that make these courses potentially attractive to lifelong learning. Addressing all these challenges at

once for all courses is not realistic but aligning such an effort to other proposals that are well supported in the strategic plan consultation would be a way forward that combined a strategic approach with high quality operational delivery. The educational component proposed in the *Evolving the Grand Challenges* paper would be a productive way to begin such a platform initiative.

To take this forward, we propose that a task force be established to advise on potential next steps for an evolution of our online education to address some of these opportunities and challenge, including the preparation of a more detailed business case.

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3 <https://www.hesa.ac.uk/data-and-analysis/business-community/services#cpd>

# Summary of modelling outcomes

It is readily apparent from the modelling that not all outcomes are feasible. For example, a much - or even slightly - smaller university in terms of number of students that nevertheless maintained the same numbers of staff is not financially viable particularly in the current external environment. The appetite for academic investment expressed in feedback on the earlier papers, coupled with widespread support for our comprehensive nature, suggests that this is a future that we would not wish to contemplate. We therefore propose to **rule these scenarios out** from further consideration.

A much bigger university in terms of number of students would be able to fulfil many of the ideas for academic development expressed in the papers and feedback received on the Strategic Plan 2022-27. However, the modelling suggests that the capital requirements for this would substantially exceed our ability to generate the marginal benefit to finance it, either directly or through borrowing. The associated negative impact on student experience also contradicts our proposals in this consultation to focus on improving the student experience. These outcomes suggest that we should moderate our academic ambition to meet our ability to finance it. We therefore propose to **rule this scenario out** from further consideration.

Finally, we consider the two remaining scenarios, Scenario 0 (status quo) and Scenario 4 (a limited expansion). In the context of the strategic plan consultation, and additional feedback received describing new academic initiatives, we propose that a limited degree of expansion is the most likely scenario to fit our academic needs, but with some important qualifications that require further discussion. In the longer term, the UCL East Phase 2 site, which is available for development up to 2037, provides additional options beyond the period of the Strategic Plan 2022-27.

First, we will need to attend to some of the parameters we have examined, particularly **space efficiency** and **unregulated fees**. This is necessary to accommodate a moderate amount of academic investment.

Second, we should consider a more **sophisticated online offering at greater scale**, so that we can continue to respond to academic initiatives for new course content while moderating pressures on the operating margin and on the teaching estate. However, a more detailed consideration of this proposal is necessary. It is usual for online education to require significant initial investment to create a high-quality platform, capture fee (or course) income, provide micro-credentialling and other important aspects. In addition, we will need to consider what the right balance of online and face-to-face modes of education might be appropriate, given our strong commitment to, and our current student body's strong expressed desire for, a campus experience in the heart of London. We therefore propose that this possibility should receive **further detailed consideration** during the life of the Strategic Plan 2022-27.

Finally, to fund the ambitions necessary for these academic developments, the revenue generated from limited expansion will, on its own, be insufficient. We propose that such a scenario should also focus on **cost reduction** as set out in paper six, *Enabling our academic mission*. The urgency of such an approach is further amplified by the current inflationary environment and the changes in UK inflation that have occurred since the start of this consultation on the Strategic Plan 2022-27.

# Conclusion

Our high-level modelling illustrates the complexity of how size and shape affects our financial health and sustainability as an institution, quite apart from its consequences for our academic excellence. We have identified the key parameters and their trade-offs in terms of staff and students that affect our marginal benefit – principally unregulated fees and space efficiency – and can begin to appreciate some of the trade-offs that relate these different parameters.

These scenarios illustrate four possible futures for our institution. Many other potential futures are possible, but to progress in the strategic plan consultation we will need to converge on one possible future. The scenario analysis, which is one component of such a debate, suggests we should direct any future growth much more strongly towards online education, and pay attention to those size and shape parameters that improve income while reducing costs. **We seek comments from our community on whether such a conclusion is supported for the institution.**

It is important to emphasise, however, that this paper has necessarily taken a high-level view of aggregate student numbers. Similarly, conversations about the shape of our student body (foreshadowed in the opening of this paper as intended to take place later in the strategic period) will also be conducted at the institutional level.

Our size and shape are, of course, not only the product of high-level strategy, but also of the specific pedagogical opportunities identified by faculties and departments. **In response to this paper, therefore, we are keen that faculties, in collaboration with departments, should reconsider their student number aspirations and submit responses giving broad indications of whether they would like to grow or to shrink student numbers during the period of the strategic plan, and whether amongst award or non-award, online or on-campus students.** This will give us the opportunity to bring feedback about institutional and faculty aspirations together.

These are complex and important questions for UCL to face over the next five years and we encourage comment and feedback on our community on what they see as the ideal size of our student body considering all these trade-offs.

# Appendix 1

Several key parameters contribute to the size and shape of a university, and together they determine its sustainability in terms of financial, human, social and intellectual capital. This appendix summarises some of these factors. For a broader overview of university finance, the British University Finance Directors' Group guide to Understanding University Finance is a helpful introduction<sup>4</sup>.

## Number of students

The number of enrolled students is the most obvious determinant of size and shape. While external factors like the unexpected changes in A-level awarding criteria during the pandemic can influence the overall number enrolled, internal pedagogical factors chiefly determine numbers: expanding, adding or removing programmes obviously increases or decreases the size of the cohort. Course closures are to date rare at UCL and so it is the former factors that predominate, increasing both size and complexity as highlighted in *UCL Now*.

Tuition fees have been the largest source of income for research-intensive universities in the UK since the reforms of 2011 removed almost all central government grant support for universities, along with the cap on student numbers. However, increasing income by increasing student numbers also increases the associated costs of delivering that teaching. The marginal cost of teaching and learning, and whether the fees from additional student numbers cover the additional teaching costs, is therefore important to consider. Until now, for most courses at UCL this information has not been available.

In general, nationally pooled cost estimates (Figure 2) show that the income generated by teaching UK students does not fully cover the costs of delivering that teaching, and this difference has been exacerbated because while the cost of teaching has been rising in line with inflation, tuition fees have been fixed since 2016. Even with substantial cost-saving measures, the gap has increased

significantly, and it will increase further for all UK institutions during the period of the Strategic Plan 2022-27 because the Government has announced that the tuition fee will remain fixed at least until 2024/25, while consumer price inflation has risen above 9.0%, its highest annual rate for forty years.



Figure 2: TRAC full economic cost surplus/deficit by activity, 2020-21 for all higher education institutions in England and Northern Ireland. Data taken from [https://www.officeforstudents.org.uk/media/d4b74bf2-a06c-464b-8b97-c892a08d32a9/annual-trac-2020-21\\_sect](https://www.officeforstudents.org.uk/media/d4b74bf2-a06c-464b-8b97-c892a08d32a9/annual-trac-2020-21_sect)

<sup>4</sup> <https://www.bufdg.ac.uk/ViewDocument.aspx?t=1&ID=12141&GUID=2e7095c2-00bf-4107-b9bc-0a4485694489&dl=1>

The financial challenge that this creates for higher education institutions in the UK is apparent in a recent National Audit Office report, which found that roughly one-third (eighty) of the higher education providers in England had an in-year financial deficit in the financial year 2019/20. Of those 17 had been in deficit for two years and a further 20 in deficit for three years or more.

In contrast to home students, the fees paid by undergraduate and postgraduate students from outside the UK are not regulated and can be varied by each university independently. This means that in general the income provided by overseas students covers, or more than covers, the costs of teaching them. However, there are both economic and moral limits on the extent to which tuition fees for overseas students can be increased, and there are important consequences for diversity and widening participation from high unregulated fees. Moreover, it is an open question as to whether there should be any limits on the overall proportion of overseas students at a university compared to 'home' students, both on diversity grounds as well as in terms of social license to operate.

A final factor affecting size and shape is the proportion of undergraduate to postgraduate students. The two groups have different pedagogical and co-curricular needs and often come from quite different student markets.

The mixture of UK and overseas students, and the mixture of undergraduate and postgraduate students, will therefore have both pedagogical and financial consequences that need to be considered when assessing what an acceptable size and shape for UCL might be. For example, it might be argued that UCL should enroll a majority of UK students. Equally, it might be argued that diversity of student domicile is a huge asset to a comprehensive university, and we should encourage a wide diversity of students from across the world. Balancing these different views is an important aspect of size and shape.

## Number of staff

As the number of students increases, generally the number of academic staff to teach them also increases. At UCL the student-staff ratio shows substantial disciplinary variation, for reasons that are not clear. As it is an average across large groups of staff, it can also be distorted by the presence of large, embedded research institutes with external

funding that are often required to limit their teaching commitment due to the desires of their funders or donors.

A larger institution generally also needs more professional services staff to provide a constant standard of enabling activity to underpin the academic mission, together with the academic services increasingly provided by some professional services staff (e.g. UCL Advanced Research Computing). Whether there is a "correct" number of professional services staff for a given size of university is a contested notion, but benchmarking data are available for different institutions through the Cubane survey<sup>5</sup>.

Staff expenditure is the biggest single item in UK university budgets. The financial sustainability of any university at any given size and shape is therefore critically also determined by the level of reward offered to staff. World-leading universities are typically in a global market for talent, so must consider appropriate levels of reward.

## Volume of research

A research-intensive university with more academic staff typically wins more research and innovation income from research foundations, government funders and commercial sources. This in turn can contribute to growth in size as the research and innovation income is largely used to employ research staff and pay for their associated equipment.

An important concern for all research-intensive universities in the UK, whatever their size, is how to pay for the indirect costs of increased research activity. Some research grants provide a proportion of these indirect costs (so-called 'full economic costing') and universities also receive quality-related (QR) research funding in proportion to the externally assessed quality of their research and the volume of nationally competitive charitable grant funding. But by design these sources of income never cover the full cost of the research they fund, and some major funders like the National Institute for Health and Care Research (NIHR) choose to provide no indirect costs at all.

The more research is undertaken, the greater this financial gap becomes – in the UK system it is now estimated at £4.6bn per annum<sup>6</sup> across all universities. Research funders (and government) assume that the gap will be paid for from the

<sup>5</sup> <https://www.cubaneconsulting.com/uniformum>

<sup>6</sup> <https://www.russellgroup.ac.uk/media/6004/russell-group-spending-review-2021-submission.pdf>

universities' other sources of income, including student tuition fee income and other unregulated income.

For an individual university, the shape of the research base determines the size of this gap. This is because the degree to which indirect costs are paid depends on the research funder, and can vary from 0% (e.g. NIHR) to 100% (or occasionally more) for some forms of commercial income. Typically, at UCL for every £1 of indirect research cost, we receive between 51p and 76p (depending on specific source of research funding) of indirect research income. The remainder must flow from student tuition fees or other sources of unregulated income.

A greater volume of research therefore means we must generate additional income to cover indirect research costs and creates a financial tension between research and teaching. This tension is exacerbated in the UK system because research funding available from national and international funders is not spread evenly across disciplines. Instead, the availability of research funding from (for example) UKRI Councils is somewhat larger in STEM disciplines. The direct and indirect costs of some types of research (particularly in STEM) are also often much higher than for other disciplines. Thus, in comprehensive research-intensive UK universities, a size and shape that emphasises STEM disciplines creates a particular financial challenge.

Finally, it should be noted that for a research-intensive university, the quality and impact of the research that is undertaken has an important relationship to the quality and volume of undergraduate students that are attracted to apply to and study at such a university. Put simply, a reputation for high quality research attracts high quality students. There are also non-financial reasons why such an interdependency is valuable as it enables the pursuit of a research-intensive teaching model. For example, it allows deep student engagement with research through project work.

Taken together, this analysis suggests that larger volumes and a greater disciplinary mix of research can support higher quality and volumes of students, and that the reverse is also true. But it is unlikely that large volumes of research can be supported by small numbers of students without significant unregulated income. A very small number of universities in the UK have access to such major sources of unregulated income. For example, the for-profit Oxford University Press made a profit

of £42.9M<sup>7</sup> in 2020/21 that can be used by the university to support the indirect costs of research and teaching or other activities. In Cambridge, the surplus of the for-profit Cambridge Assessment available to the university<sup>8</sup> in 2021/22 was £81M (in addition to a £14M surplus from the for-profit Cambridge University Press). These sources of surplus are not available to UCL because of our commitment to the world's first fully Open Access university press, UCL Press.

## Space utilisation

Some academic disciplines require more space than others for both teaching (e.g. specialist practice- or practical-based teaching) and research. These factors affect the marginal cost of both teaching and research. The provision of specialist space, and space utilisation in general, is therefore an important consideration for the size and shape of an institution because it affects the overall mixture of disciplines, staff and students that is financially sustainable.

Space costs also vary in absolute terms depending on the geographical location of the institution, and London is a high-cost environment in which to operate. The cost of commercial office space<sup>9</sup> illustrates this. For example, in 2022 commercial office rents in Liverpool and Newcastle varied between £18 and £25 per square foot. The equivalent cost in London was £60 – 85 per square foot, over three times higher. Historically the UK Government has recognised this by providing funding, the London Weighting, to higher education providers in the city, which amounts to some £60-70M across London. However, recent guidance from the Department for Education to the Office for Students suggests that this should be removed from the Strategic Priorities Grant with immediate effect. The motivation for this recommendation is that this type of funding is seen as being inconsistent with the desire to level up the economy across the regions. The higher costs of operating in London can also be partially compensated by higher indirect cost recovery for research.

At UCL, we currently operate a very large and extremely complex estate. The overall size of the estate is determined in part by the number of staff and students we have and by the type of specialist facilities we require. But the quality of space, and the efficiency with which it is used, are also critically important, particularly given changing patterns of work following the pandemic.

7 <https://www.ox.ac.uk/sites/files/oxford/Oxford%20University%2C%20Financial%20Statements%202020-21.pdf>

8 <https://www.admin.cam.ac.uk/reporter/2021-22/weekly/6653/6653-FinancialStatements2020-21.pdf>

9 Source: <https://www.oktra.co.uk/insights/the-cost-of-uk-office-space/>

## Operating margin

Since the university reforms of 2011 ended capital funding from government for teaching and research, every higher education institution in the UK has had to raise any capital required for investment in physical or digital infrastructure itself. Some of this can come from the institution's own financial resources or from borrowing that must be paid back, but both of these possibilities require that the institution generates an annual operating margin for investment. At the same time an operating margin should support the financial sustainability of the organization, especially in the context of unexpected financial shocks. These may be an increasingly familiar feature of the world at large, as the pandemic, the war in Ukraine, high inflation, and increasingly volatile weather patterns associated with the climate crisis demonstrates.

cost (or benefit) of a given mix of course areas at a given volume and mix of students, an estimate of the marginal loss incurred by a given volume and disciplinary mix of research, and the difference between the two. Like all models, it will be both imperfect and reliant on assumptions. However, provided it is validated appropriately against those assumptions and existing data, it can provide an important guide to help understand the more complex relationships between these parameters. This model is further explored in the main paper.

## Trade offs

It is readily apparent that the parameters described above – student and staff numbers, research volume, space utilisation and operating margin – trade off against each other in determining whether a particular size and shape is possible. Often this is intuitive: for example, it is immediately clear that if research volume increases without any change in its distribution or cost recovery, a constant operating margin for investment in new academic activity can only be maintained by taking on additional students.

However, more complex combinations of these different parameters are the norm at institutional level. We can see this in the combination of proposals set out so far for consideration in the Strategic Plan 2022-27. For example, the *Education Priorities and Programmes* paper articulates proposals that may change the distribution of modules and courses (and thus student numbers); the *Enabling our Academic Mission* paper proposes investment and reforms that will alter the number of professional services staff and their distribution across faculties and central professional services (PS); the *Evolving the UCL Grand Challenges* paper proposes recruiting academic staff and delivering new teaching; and the *Academic Opportunities for Targeted Investment* paper proposes all of this plus additional capital expenditure in digital and physical infrastructure.

To understand the impact of different combinations of these parameters requires a high-level model that quantitatively reflects their relationship. It requires an estimate of the marginal

# Appendix 2

The Size and Shape Model used to run these scenarios is a high-level model, not a financial model such as that put together for the university's budget process. It cannot be used to answer detailed financial questions about (for example) individual departments, nor can it provide precise information about the overall operating margin, as this depends on detailed financial considerations such as the role of inflation in varying our operating costs over time.

In the Size and Shape model, certain assumptions have been made to increase the flexibility with which different combinations of variables can be adjusted. These assumptions, and the scope of the model itself, are noted below. It uses 2019, the most recent completed typical year, as the baseline for student, staff and cost data.

## Student FTE:

The Size and Shape Model uses the Student Number Planning projections from March 2022 as the source for projected student FTE in 2027. This is the same data that is used in UCL's financial modelling and includes the UCL East business case (but not the recent additional circa 700 student FTE approved by UMC in May 2022).

Note, however, that the model focusses on UCL's primary sources of teaching income and is therefore focused on taught UG and PG FTE. PGR and ITE FTE are excluded. This diverges from UCL's financial modelling, which includes all student FTE except overseas affiliates.

Student FTE are used because they are the most accurate drivers of costs associated with teaching and learning. However, it is also possible to calculate figures for headcount associated with changes in FTE under the assumption that the proportion of students studying part time will remain constant. This calculation should multiply FTE by 1.034, based on the 2019 baseline figures used in the model of 34,467 student FTE representing 35,629 headcount i.e. a conversion factor of 1.034.

## Tuition fees:

Tuition fees are averaged per FTE by department, level and fee status. The Size and Shape Model does not include planned tuition fee increases in scope.

## Staff FTE and costs:

The Size and Shape Model focusses on the staff FTE used to support a given student population. In the case of these scenarios, this means the academic FTE is projected from the student FTE population. The supporting PS FTE is projected from the academic FTE population. Research only and non-core funded staff are excluded, as these are dealt with separately in the research funding part of the model, and to reduce the complexity of the model itself. UCL's full financial modelling will, of course, include all staff types in scope.

The Size and Shape Model includes the central costs related to teaching (as per TRAC), plus the 'other' costs related to space. Non-space 'other' costs are excluded, while research TRAC central costs are dealt with in the research reinvestment part of the model.

## Research reinvestment

In the scenarios run, it is assumed that two-thirds of the remaining teaching surplus (when the in-scope expenditure has been removed from the in-scope income) is reinvested into research activities. Of course this proportion may vary depending on the amount and type of research executed in any financial year.

## The amount of money “left over”

At a UCL level, the amount of income left over once expenditure has been accounted for is commonly known as the operating surplus or margin.

The Size and Shape Model also provides an amount of money left over for each scenario, which is the amount of relevant income (tuition fee income for those students in-scope) remaining once the relevant costs (relevant staff costs, central costs) have been accounted for. In this paper, it is referred to as the ‘marginal benefit’. This is not the same as UCL’s overall ‘surplus’ or ‘margin’ of the type we see in financial statements, because the Size and Shape Model is not a complete financial model, and is not designed to be.

Therefore, the amount of money ‘left over’ in the scenarios should not be compared to the amount of money ‘left over’ in UCL’s financial statements or models. The former allows us to compare the relative sustainability of modelled student FTE scenarios, while the latter allows us to understand the financial health of the entire institution.

## Caveats

Finally, we would like to make clear, explicitly, the following caveats of the model:

- a. the model does not make decisions for UCL but supports and elaborates on discussions regarding UCL’s size and shape. It presents a projection based on assumptions but is not predictive.
- b. this model and its outputs focus on teaching and research income and expenditure, and as such is a partial view of UCL’s activity. UCL has other sources of income, for example, from residences and catering, health authority income, UCLB, philanthropy and other innovation and enterprise activity. In the 2020 Financial Statement, this ‘Other income’ totalled around £200m (or 13%) of total income.
- c. teaching-led expenditure related to the Biological Services Unit is excluded from the model outputs.
- d. all planned fee increases, including EU students transitioning to be classified as overseas students, occur in the model in 2021/22.
- e. factors outside UCL’s control, including inflation, the outcome and impact of the Augar review<sup>1</sup> and pensions negotiations, are excluded from the model.
- f. the model suggests that the decision to carry out research is dependent on student FTE. It should be emphasised that this is not the case in reality, but that there is a necessary link between student FTE, teaching surplus, and research investment within the model.

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1 <https://www.gov.uk/government/publications/post-18-review-of-education-and-funding-independent-panel-report>

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