Exploring the value of QR in supporting researcher-scale activities

Development of methods and a case study of the University of Cambridge

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Cover Image by DragonLight Films
This research project was funded by Research England and the University of Cambridge to explore the contribution of Quality-related Research (QR) funding by identifying practical examples from the University of Cambridge through case studies and data analysis. Research England is the council within UK Research and Innovation (UKRI) which oversees UKRI’s England-only functions in relation to university research and knowledge exchange. Among other responsibilities, Research England develops and implements the Research Excellence Framework (REF) exercise in partnership with the other UK Higher Education funding bodies and administers the QR block grant issued to universities in England.

The opinions expressed in this report are those of the authors and do not represent the position of the funders of the work or of the University of Cambridge.

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Research at universities in the UK is funded through a system of dual support: project and programme specific grants; and a block grant (Quality-related Research (QR) funding) is awarded to institutions to spend at their own discretion. How QR funding contributes to research has rarely been studied, and consequently, this project explored some of the ways that QR supports the research of individual researchers and used the University of Cambridge as a pilot case.

We used qualitative and quantitative methods to investigate a number of aspects of academic life that could be linked to QR including sabbaticals; publications which lack external funding acknowledgements or links to grants; seed grant schemes; and salary support which bridges researchers between fixed term contracts. All methods – used and attempted – are described and accompanied by a set of reflections for further evaluations of QR's impact at other institutions.

We found that QR makes many contributions to the research environment across all disciplines supporting the conception and incubation of new ideas. Furthermore, QR can support the entire research endeavour in more theory-based disciplines such as the arts, humanities, mathematics, computer science, as well as pockets of other fields where project costs are lower.
Executive summary

Background

This pilot project developed methods to assess the value of Quality-related Research (QR) funding through activities at the scale of individual researchers and tested those methods at the University of Cambridge. QR is the block grant awarded to universities for recurrent research expenses.

The other leg is awarded as discrete grants and contracts which are awarded to carry out specific research projects or programmes. In contrast, QR is awarded to carry out specific research projects or programmes. In contrast to project, programme and fellowship funding, QR is awarded to institutions to be spent at the institutions’ discretion to most effectively support research.

Government funding for university research has been provided in various forms over the last century. From the start, universities were given almost complete discretion to decide how they could most effectively support research. The government now provides many streams of funding for research which is often directed toward specific objectives or subject areas. QR is the element of funding that is most closely linked to that original funding and recognises the value of a university’s expertise and discretion on how it is spent.

The value provided by project, programme and fellowship grant funding has already been investigated and illustrated in many studies across a range of fields. In contrast, QR funding has only been examined in certain specific aspects (Hughes et al., 2013; PACEC and Centre for Business Research, University of Cambridge, 2014; Wellcome Trust, 2018; Smith, 2019; Gottlieb et al., 2021; Russell Group, 2021).

This study does not attempt to assess the overall value of QR but seeks to investigate a previously understudied area: how the flexibility of QR can be used by individual researchers.

Approach

We examined researcher-scale activities and effects – a central aspect of the devolved and discretionary nature of QR – which have been less well studied than larger scale strategic activities. We consider researcher-scale effects to be those where individual researchers have discretion, or where the effects manifest themselves differently from researcher to researcher so they cannot be uniformly examined at a department or institution level.

This project developed and tested techniques to understand the researcher-scale effects of QR by combining quantitative and qualitative techniques to identify and explore them. Because of the difficulty of making direct links between activities and QR funding – due to not being differentiated from other forms of income – we identified researcher-scale effects by looking at:

- research outputs without acknowledged external funding;
- activities, such as sabbaticals, that could be linked to QR, and their outputs;
- features of the research system enabled by activities that QR allowed.

These investigations led us to focus on idea generation and incubation; the role of sabbaticals; the effects of the integration of teaching and research; how new researchers are established; bridge funding between fixed-term contracts; small-scale seed funding schemes; synthesis publications; and interdisciplinary networks.
Findings: QR supports individual researchers in a variety of important ways

Beyond the specific activities and outputs with links to QR, we identified QR’s most significant contributions at a researcher-scale as:

- Providing – in all disciplines – a foundational environment for nurturing new ideas by:
  » allowing the effective combination of teaching and research which keeps research expertise broad and current;
  » reducing teaching commitments and providing start-up funding to help establish new researchers;
  » providing permanent employment contracts and bridging funding between fixed-term contracts enabling expertise to be retained.

- Supporting – in all disciplines – the incubation of new ideas by:
  » providing uninterrupted time allowing for the exploration of new subject areas and testing of novel ideas, which may lead to new research directions;
  » providing an incubation phase for new ideas allowing them to become competitive for external grant support;
  » providing time to situate research findings in their context or to map the current state of a research field allowing researchers to identify appropriate next steps;
  » providing a counterweight to discipline-specific structure of university departments and external funding supporting interdisciplinary collaboration.

- Supporting the entire research endeavour in the arts, humanities, some social sciences, but also in other theory-based disciplines such as mathematics and computer science and in pockets of research in other disciplines.

One of the key reasons QR plays such an important role in supporting the generation and incubation of new ideas is that it allows individual researchers the space to think and gives them discretion over what to investigate. This freedom allows a wider range of ideas to be explored and tested than would be the case if external selection occurred at an earlier point. It enables the idea that initially seemed mad to others, but turns out to be transformative, the chance to grow.

Methodological reflections

This project employed a variety of quantitative and qualitative methods to assess a range of fundamental features of the research environment at the University of Cambridge. We took a multi-method approach because the value of QR at the researcher-scale is evident in a variety of ways and can dramatically differ between disciplines.

University administration systems often tend to combine (rather than separate) sources of funding. For example, academic salaries are often paid from a pot made by combining teaching and research funding sources. The University of Cambridge goes further than most institutions in this aggregation of funding sources. For that reason, we included in our scope any researcher-scale activities funded by institutional discretionary funding whether or not they could be directly linked to QR by using the test of whether such activities would be expected to increase with additional QR and decrease with reductions in QR.
This project could not have been completed without access to institutional records such as: information on timings of sabbaticals across the University and the database of Cambridge-authored publications and their bibliometrics. We chose to focus on the University of Cambridge because we were granted access to, and familiar with, the internal administrative (grants and Human Resources (HR)) and research outputs databases. Selecting the University of Cambridge also had the advantage of there being a large variety of research carried out within the University (it submitted to 30 of the 34 disciplinary units of assessment in REF2021). In addition, there is considerable delegation of the decisions needing to be made that relate to internal funding. This increased the significance of the researcher-scale activities we wanted to explore.

Due to time, resource, and pandemic-related constraints of the project, we had to leave many interesting potential investigations for future research. These included: a broader analysis of sabbatical leave request forms; an analysis of the contribution of QR to visiting academics; and the effect of the University’s professional services staff in reducing the administrative burden on academics to allow them to spend more time on research.

Limitations of this study

The line between researcher-scale and department-level or institution-scale initiatives is somewhat blurred. We drew that line to exclude larger scale activities which would have encompassed such aspects as the Postdoc Academy, the Returning Carers Scheme, libraries, and other support services. We focused on activities where we could see meaningful counterfactuals within the institution, for example time on sabbatical versus time not on sabbatical.

Despite the similarities to other universities noted above, the University of Cambridge is uncharacteristic in its scale, the balance of its funding streams (including many endowed posts), and its collegiate structure.

Because of the difficulty of tracing the activities enabled by – and outputs produced with – QR support, the benefits catalogued in this report are likely to be an underestimate of the total value provided by QR even at the researcher scale. However, they give a flavour of the variety and complexity of the contribution.

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1. The project ran from March 2020 through three UK national lockdowns to July 2021.
The study was supported by a research grant from Research England, financial support from the University of Cambridge, and in-kind contributions from the British Academy and the Royal Society. We would like to thank the members of this project’s Advisory Group for their insight throughout all stages of this project: Dr Lewis Dean (Research England), Claire Packman (Research England), Steph Bales (Teesside University and ARMA), Prof Stella Bruzzi (University College London and the British Academy), Dr Sarah Parks (UK Research and Innovation), Prof Nick Talbot (The Sainsbury Laboratory and the Royal Society), and Dr Molly Morgan Jones (The British Academy).

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Introduction

Background and context

Research in UK universities is funded by a 'dual support' system. This comprises two legs of funding:

- One leg is funding for research awarded from external funders which includes government entities like research councils, charities, and industry. These awards are typically earned through competitive peer review application processes. Research grants typically cover the majority of costs for activities directly related to specific projects or programmes.

- The other leg is funding from government (currently administered by Research England in England, and higher education funding councils in devolved nations) in the form of a recurring block grant. This funding is awarded in line with periodic assessments of the quality of research at each university (most recently via the Research Excellence Framework (REF)), and hence referred to as Quality-related Research (QR) funding.

The appropriate balance between external grant funding and block grants is a live and ongoing debate (Adams and Bekhradnia, 2004; Chaytor, Gottlieb and Reid, 2021; Gottlieb et al., 2021). QR has been referred to by The British Academy as "vital in supporting both the physical and human infrastructure of the entire research ecosystem" (The British Academy, 2020), by the Russell Group as "essential" (Russell Group, 2021) and by the Royal Society as "a crucial part of the UK’s current and future research landscape that the Society strongly supports" (The Royal Society, 2016). In this context it is worth noting that every academic we spoke to with an understanding of the dual support system (which tended to be the more senior academics) suggested that QR funding is crucial to the health of the UK research system as currently configured. Further, many expressed their concern that QR is currently insufficient to sustain the performance of UK research. This project aims to contribute to the evidence base to inform these debates.

QR forms a large part of universities' discretionary funds for research activities. UK Research and Innovation (UKRI) is the overarching body for seven disciplinary research councils, Innovate UK, and Research England. The last three financial years of 'research and innovation' expenditures for these bodies is shown in Figure 1. The graph shows the relative proportion of each leg of dual support.
According to the University of Cambridge Annual Report 2018-2019, the University received £128.3 million from Research England in the form of QR. This represents 7.2% of all QR funding allocated to English universities (University of Cambridge, 2019). In 2019-2020, Cambridge reported a QR award of £127 million which represented 7.5% of all QR funding allocated to English universities (University of Cambridge, 2020). A summary of the University of Cambridge’s research income in the financial years of 2018-2019 and 2019-2020 is visible in Figure 2. These figures suggest that QR made up 17.8% of the University’s total research income (£720.7 million) in 2018-2019, and 17.9% of the University’s total research income of £706.4 million in 2019-2020.

Research England describes the role of QR funding as providing “stability and flexibility” allowing the recipients to:

- Drive innovation and respond to changing needs.
- Invest in new and emerging areas and support the cutting-edge of research.
- Grow and support new talent in important research areas.
- Sustain a world-class research environment.2

Aims and scope of the project

This pilot project is a first attempt at identifying and understanding the value that QR funding provides the research system at the researcher-scale, where individual researchers have the autonomy to use the time allocated, or the funds provided, to support their own research agenda. It also tested a range of methods to provide a possible model for other universities wishing to carry out similar investigations.

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2 https://re.ukri.org/funding/quality-related-research-funding/
This research project did not look to comprehensively catalogue QR’s contribution to university research. Rather, it investigated some aspects of QR that have not previously been explored.

The defining characteristic of QR is that it is spent at the institution’s discretion. In some cases within the University of Cambridge, that discretion is delegated down to a school or departmental level. QR is often used to support institution-level initiatives which might be subject-based, such as the ‘Cambridge Zero’[^3] environmental initiative or theme-based such as the Returning Carers Scheme[^4]. In this project we focused on finer levels of granularity to identify the ways researchers themselves use and are supported by QR. These forms of support vary in how researchers make use of them and are experienced differently by different researchers. We have termed this type of support ‘researcher-scale’ support.

It is important to note that we only looked at a fraction of the value that QR provides to the research system. Larger scale impacts of QR are also an important part of QR’s contribution but their shape, as discrete research units, often make them easier to evaluate with more traditional research evaluation methods. This project focused on the more diffuse and potentially overlooked ways that an institution’s discretionary spending can produce valuable research outcomes.

Figure 3 provides a summary of the scope of the project. The definition of ‘research-scale’ is not always clear cut; some aspects of support that blur the boundaries between researcher - and department - scale are interdisciplinary research networks and equality and diversity initiatives.

[^3]: https://www.zero.cam.ac.uk
[^4]: https://www.hr.admin.cam.ac.uk/policies-procedures/returning-carers-scheme
Overview of research approach

We applied three approaches to identify the different ways that QR funding benefits the research system which influenced each other. These are illustrated in Figure 4.

First, we looked for outputs that we could ‘link’ to QR, such as publications that acknowledge no external sources of funding. Alongside this we examined the history of QR funding and reviewed theoretical discussions of science funding to identify areas that QR funding was intended for or might be expected to support, such as the nurturing of new and unconventional ideas.

Second, we looked for activities where we could trace a financial link to QR. For example, sabbaticals have no other obvious source of funding besides QR.

Third, we examined the characteristics of the research system that are enabled by activities supported by QR. For example, there was a consensus among interviewees that sabbaticals allow the effective combination of teaching and research.

We used each of these elements to reinforce each other when: a) investigating activities supported by QR to find more outputs of QR; and b) investigating outputs relating to QR to find more activities related to QR.

We combined qualitative and quantitative approaches to:

- Explore the nuanced experience of researchers in the research system through semi-structured interviews.
- Analyse bibliometric and institutional administrative data to test the generalisability of researchers’ observations.
Subject and disciplinary classifications

We were aware that research inputs can vary quite markedly between disciplines. We also wanted to ensure that whichever lens we used to capture disciplinary differences could be easily replicated by other institutions wishing to further analyse the value of QR. Therefore, we chose to undertake the quantitative analysis by using the REF’s 34 Units of Assessment (UOAs), which have already been developed with the aim of capturing the diversity of disciplinary research practices while still trying to maintain as few units as possible. Cambridge submitted to 30 of the 34 UOAs, and because this project was carried out while the REF 2021 exercise was being completed, all academics at Cambridge were assigned a UOA. Main Panels were also used as an organising framework for sampling academics across the University to interview and other strands of quantitative analysis.

Institutional setting: the University of Cambridge context

This project used the University of Cambridge as a testing ground for developing methods and used the results to draw some tentative conclusions about the roles that QR plays. There is a diversity of higher education institutions, and the results need to be interpreted in that context.

Research at the University of Cambridge is similar to other UK universities in many fundamental respects. For example, most research universities are supported through dual support; academics at universities across the UK are expected to manage responsibilities in teaching and research in their discipline; and academics use a similar range of research approaches to produce a similar variety of outputs. Additionally, all university academics with significant responsibility for research participate in the national Research Excellence Framework (REF) exercise which underpins the allocation of QR funding.

5. https://www.ref.ac.uk/panels/units-of-assessment/ Please note that Cambridge does not submit to UOAs 3, 20, 24 or 34
6. Main Panel A: Medicine, health and life sciences; Main Panel B: Physical sciences, engineering and mathematics; Main Panel C: Social sciences; Main Panel D: Arts and Humanities

Figure 4: Conceptual map of research approach for identifying the benefits of QR
The advantage of examining researchers and research at the University of Cambridge included:

- **Variety**: There is an immense range of research activity across most academic disciplines.
- **Scale**: There is a large volume of research happening which provides a larger sample of researchers and research to examine.
- **Delegation**: There is considerable delegation of funding and research freedom which gives more significance to research-scale activities.
- **Data access**: Access was permitted to internal administrative data for the quantitative analysis and for stratifying our sampling frame for interviewees to ensure a balanced representation of seniority, gender, and disciplines.

However, the University of Cambridge is uncharacteristic of other higher education institutions in a number of ways, and often at the other end of the continuum for shared characteristics including:

- **Combination of income sources**: Central University income is collected in an account referred to as the 'Chest' (a reference to the iron bound trunk in which the University historically stored valuables). This income includes QR but also includes the block grant related to teaching, student fees, and other forms of income such as investments and profits from subsidiary organisations. The Chest funds are then allocated out to the University's academic and administrative units to fund teaching activities, academic salaries, institutional research initiatives, unmet costs of grants and a host of other diffuse/not self-contained activities. This method of allocation often makes it impossible to trace QR directly to the department level, but it is clear that changes in QR would affect the overall discretionary spending by departments. We therefore concentrated on this 'marginal' definition of relevant expenditure.

- **Allocation of QR within the University is not linked to which disciplines 'earned' the funds in the REF**: The strength of the link between which disciplines 'earn' funding in the REF and what they are allocated varies between universities. At Cambridge there is only a weak link between departmental performance in the REF and the allocation of funding from the Chest.

- **Devolution of financial decisions**: Relatively little discretionary funding is controlled from the centre of the University with more discretion at the school and department level. Much of the institutional discretionary funding is committed to academic salaries and hence there is little year to year variation.

- **Colleges**: Like the University of Oxford and the University of the Highlands and Islands, the University of Cambridge is a collegiate university. It is organised into faculties and schools and has 29 colleges which are the base for student admissions and small group teaching. This means that there are many researchers who have both College and University affiliations. College researchers include a population of junior research fellows who are registered on each college's HR system, so it was not possible to carry out comparisons across all of the early career researchers affiliated to the University.

- **Scale**: The University of Cambridge is one of the largest research-intensive universities in the UK with an annual research income of around £720 million. The annual QR grant makes up around £130 million, or a sixth, of this £720 million (University of Cambridge, 2019). It also receives substantial income from its investments and subsidiary companies. The Colleges also have their own funding, some of which directly and indirectly supports research. There is a huge range of research intensity across UK universities,
with Cambridge being at the most research-intensive end. The ways in which QR funding is used by institutions varies significantly according to their level of research intensity. The difference in Cambridge's sources of funding particularly affects the impact of QR when considering salary support as many professorial posts at the University are endowed. As endowed funds behave similarly to QR in providing long-term stability of tenure, we have included such posts as when considering the benefits provided by QR.

- **Academic calendar**: The academic year is structured into three eight-week terms in which the vast majority of teaching is concentrated. This leaves longer periods in between for academics to spend time on research.

**Structure of this report**

The next section of this report looks at the history of university research funding and identifies the themes that shaped our investigation of QR. We then discuss the experimental part of the project and provide an overview of the methods tested during the project and reflections on the challenges encountered. We then detail our findings in three themes: how QR provides the foundational environment for nurturing new ideas; how QR helps those ideas to develop; and the broader contribution that QR makes across many disciplines in the arts, humanities and social sciences. In the final section, we identify areas for further research in identifying QR's value in universities.
In the UK, the government supports research in universities through a system of ‘dual support’. One leg of dual support is a block grant offered directly to universities to spend at their discretion. This block grant is referred to as Quality-related Research or QR funding because the value of each university's block grant is dependent on its performance in the periodic Research Excellence Framework (REF) assessment (Research England, 2020). The other leg of dual support is funding for discrete programmes, projects, and research students. These funding awards are administered by seven discipline-specific research councils.

The rationale for having a system of dual support is to provide a bedrock of research infrastructure (the QR block grant) upon which specific projects (research council awards) can be carried out as and when they are awarded. Additionally, QR provides researchers the space to pursue their own ‘blue skies’ or ‘basic’ research in a curiosity-driven way to expand the existing frontiers of human knowledge before seeking support from a research council (Adams and Bekhradnia, 2004). The rationale for researcher freedom is the contention that they have deep expertise which makes them best placed to understand where the frontier of knowledge lies and in what directions it can best be pushed. A linked justification of dual support is that it ensures a more diverse set of individuals makes decisions about how research funds are spent (Shattock, 2012). Decisions about QR spending are made at the university level and can be devolved to separate departments or even individual academics. This provides a separate ‘hierarchy of control’ from Research Council decisions on priority areas and individual granting decisions.

Our review of the history of university research funding policy showed that a variety of financial and political changes over the last century have influenced the nature of university research funding. We identified two key themes: the tension between decision-making by scientists and politicians or civil servants; and more implicitly, the importance of funding to be used at universities' discretion.

- **In its earliest phases, decisions on how research funding was spent were made exclusively by universities themselves.** Prior to 1919, universities received block grant funding directly through Parliament to conduct research and train future generations of scientists. As a result of World War 1, it was believed that universities' financial needs were being neglected by a Parliament occupied with navigating the nation through the War. In response, a new government institution, the University Grants Committee (UGC)\(^8\), was created to provide oversight of these block grants (Shattock, 1994). The UGC investigated universities' financial needs and advised the government about them. It was housed under HM Treasury which was seen to best protect university funding from political influences. At the same time, the Haldane Committee produced its *Report on the Machinery of Government* which acknowledged that science should largely be conducted semi-independently (Flanagan *et al.*, 2019). While some departments conducted and commissioned their own mission-oriented research, it was thought that government should largely not be involved with or held responsible for science outcomes. The dominant belief was that science should be judged through peer review.

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8. The University Grants Committee operated until 1988 when it became the Universities Funding Council (UFC), which was directly responsible to Parliament. In 1992, devolved higher education funding councils replaced the UFC. In 2018, the research and knowledge exchange functions of the Higher Education Funding Council for England (HEFCE) became Research England, which operates within UK Research and Innovation (UKRI).
• In the early decades of the twentieth century, semi-autonomous government bodies (research councils) were created to supervise research into specific areas. These research councils were: firstly, the Medical Research Council (MRC); secondly, the ancestors of today’s Biotechnology and Biological Science Research Council (BBSRC) – which had in its initial form focused on agriculture and food science; and thirdly, the Natural Environment Research Council (NERC) (Flanagan et al., 2019). After the War, the value of science was highlighted for both domestic and international affairs.

• During the post-war era, the idea that the UK should develop new technology as a way to support national economic growth became dominant until investment in science eventually became more than the government’s budget could handle. In order to capitalise on these gains, a greater science literate workforce was needed. The Robbins Report affirmed that “university places should be available to all who were qualified for them by ability and attainment” (emphasis ours) (Robbins, 1963). Government invested heavily in expanding the number of higher education providers nationwide9 (via promoting polytechnics, which had not been involved in much research, to Colleges of Advanced Technology (CATs), then eventually universities) at a time when it was just starting to become clear that increasing oil prices and increasing inflation were about to radically change the government’s spending power (Shattock, 1989).

Moreover, technology itself was becoming increasingly expensive as it was being developed. During this time, the UGC started to take more of a planning role to support school leavers and facilitate the expansion of higher education (Owen, 1980). The two autonomous yet parallel systems of research funding via the UGC and the research councils continued. In 1970, the Report of the Science Research Council was the first to define this system of dual support and defended the UGC block grant as being intended to maintain ‘well found laboratories’ in which research projects of special timeliness and promise’ supported by the research councils could be mounted” (Shattock, 1989).

• Despite the government’s ongoing commitment through the 1960s to strengthen the science sector, it did not see the value for money it expected, and some university independence was lost as a result. Economic gains were not seen as commensurate with the government’s high investment in research, and it was believed that interventions should be made to remedy the overcommitment. In 1971, a pair of reports10 were published to clarify how research should be supported. The Rothschild Report asserted that government should contract the research it needed rather than leave “the country’s needs… [to] a form of scientific roulette” (Shattock, 1989). The Dainton Report asserted the enduring independence of research councils but accepted that they should listen more closely to the needs of government when determining funding priorities (Dobbs, 1972).

• The early Thatcher years continued the emphasis on national interest driving the science agenda towards industry needs, but the later Thatcher years represented a swing towards ‘curiosity-driven’ research. In the March 1981 Budget, major cuts to the UGC block grant were introduced as government identified a “lack of cost awareness” and “too much bureaucracy” in the way universities operated (Agar, 2019, p. 74). The impact of the cuts was immediately evident, and scientists voiced their deep disapproval. But government was operating in continuation of Rothschild’s ‘customer-contractor’ principle and hoped to incentivise industry to invest in research by having

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9. Polytechnics, which had not been involved in much research, were promoted to Colleges of Advanced Technology (CATs), and eventually to universities (Shattock, 1989, 2012, p. 171). The inherent inequality in research capacity between these new universities and the UK’s oldest universities has remained throughout history through today. These differences between higher education providers could suggest that the way the QR block grant is used could vary greatly between institutions.

government preferentially fund near-market research (Agar, 2019). In 1982, The Merrison Report recommended not overhauling the dual support system, but for government to exert more influence over which research was funded rather than make decisions purely on excellence. The Merrison Report recognised that the UGC block grant should be used to: 1) allow researchers to stay on the frontier of their field; 2) establish new researchers; 3) provide research continuity in the face of uncertain income and; 4) enable a wide spread of initial investigations (Adams and Bekhradnia, 2004). There were several government reports11 which highlighted the tension caused by insufficient funds to support all research areas in full, and there was much disagreement about how to distribute scarce resources. By 1987, government policy shifted radically to ‘curiosity-driven’ research. This was motivated by a desire to force industry to pay for its own research needs (Agar, 2019). Policy advisors became convinced – in part through effective advocacy from scientists themselves – that basic research was the origin of all great innovations.

• Since the mid-1980s, the policy of selectivity became and has remained an essential aspect of the research system in light of limited funding, which has manifested in the REF (formerly RAE and RSE) exercises. Universities were previously awarded the UGC block grant primarily on the basis of how many students it enrolled, even if each did not have a significant research function (Shattock, 2012). In 1986, the first Research Selectivity Exercise (RSE) was undertaken to redistribute the research-related portion of the UGC block grant to institutions that supported the most capable research environments (block grants for teaching were handled separately). The assessment was and has continued to be based on an assessment of research excellence by discipline, which is the basis of the Quality-related Research (QR) block grant this project investigates. Subsequent governments have emphasised the continuing importance of supporting research excellence, especially in light of remaining internationally competitive (Shattock, 2012). While the precise form of the selectivity exercise has changed over time (Stern, 2016), the assessment has remained intact for eight iterations over 35 years12.

• Since the early 2000s, concerns have been raised that the QR block grant has not kept pace with the increases in research council funding (Adams and Bekhradnia, 2004). According to the Russell Group, QR has decreased 14% in real terms between 2010/11 and 2020/21 (Gottlieb et al., 2021). Universities have been incentivised to over-apply for grants as a way of bringing in more income, but this has limited the ability of QR to support ‘blue skies’ research and could lead to a running down of university infrastructure (Adams and Bekhradnia, 2004).

• Recently, both legs of dual support have come together under the umbrella of a single research funding organisation. In April 2018, the non-departmental body, UK Research and Innovation (UKRI), was launched. It brings together the seven disciplinary research councils,13 Innovate UK, and Research England. Research England manages the research and knowledge exchange functions for English universities, including managing the REF exercise and QR funding. The legislation behind the creation of UKRI made the balance of funding a legislative consideration for the Secretary of State when considering UKRI budget allocations.14

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11. The First Joint Report of ABRC and ACARD (1983); A Strategy for Higher Education into the 1990s – The UGC’s Advice (1984); Civil Research And Development (House of Lords Select Committee on Science and Technology) (1986); Second Joint Report by the chairman of ABRC and ACARD (1986); A Strategy for the Science Base (1987)


13. MRC, BBSRC, NERC, the Arts and Humanities Research Council (AHRC), the Economic and Social Research Council (ESRC), the Engineering and Physical Sciences Research Council (EPSRC), and the Science and Technology Facilities Council (STFC)

In viewing this 100-year history, it becomes clear that government funding for research in England has changed in two different ways. Firstly, in terms of specificity, research funding has followed a path of punctuated evolution rather than radical change. Specificity has generally increased both in terms of the transitions from an overall grant to one specifically for research, to the split into dual support; and the dawn of selectivity and research concentration.

Secondly, there has been a swinging pendulum between tighter control by government and the expectation that industry should support research closer to market and a recognition of government’s wider role in the research system. Much of this second thread has been affected by the changing notions of the value of research and the contribution of universities to society among policymakers and politicians.

The initial role identified for what was to become QR of supporting a ‘well found laboratory’ was notably non-specific, and there has been an increased refinement of what that might mean firstly in terms of the capabilities the funding should support:

“to ensure that the research base has the capacity to undertake high-quality innovative research, and to contribute to supporting the research infrastructure. Most funding is not allocated to any specific activity - it may contribute towards the costs of salaries for permanent academic staff, premises, libraries or central computing, among other things. It supports fundamental and ‘blue skies’ research conducted by higher education providers, and contributes to the cost of training new researchers” (Research England, 2020, p. 6).

And secondly, in terms of the things QR should do:

- Drive innovation and respond to changing needs.
- Invest in new and emerging areas and support the cutting-edge of research.
- Grow and support new talent in important research areas.
- Sustain a world-class research environment.\(^{15}\)

But a core sustained idea is that it is valuable to have a source of support for research where the spending of that resource is delegated to those with the best knowledge of the research problems – the universities, faculties, departments and the researchers themselves. This project aims to understand more about how researchers take advantage of this freedom to develop their research.

\(^{15}\) https://re.ukri.org/funding/quality-related-research-funding/
In this section, we outline the range of qualitative and quantitative methods we employed to explore the contribution of QR. It includes our reflections on each method's effectiveness to serve as a guide for other universities that may wish to conduct similar QR evaluation exercises. It also notes some methods that we considered but were not feasible for this project.

Interviewing prize-winning academics

**Aim**

Understand the origin of key research ideas in fields where citation metrics are particularly sparse. By understanding where ideas came from, we hoped to uncover examples where QR supported those ideas from conception through to their prize-winning recognition.

**Methods**

Take a list of respected research prizes compiled through international survey work (Meho, 2020), identify University of Cambridge recipients through internet searches, approach them by email, conduct a semi-structured interview on the origin of their ideas and contribution of QR supported activities.

**Reflections**

- High response rate: 100% (i.e., six interviews from six invitations).
- Most prizes are for lifetime achievement, not a single idea, despite prize citations.
- Produced very demographically biased sample that was all senior and a majority male.
- Provided reflections on the other aspects of the project (e.g., stories about how sabbaticals were used).

Interviewing academics identified by their significant publications

**Aim**

Identify a wide variety of researchers with more balanced demographics than the prize-winning academics who have produced at least one piece of 'significant' research. Explore the origins of their research idea and wider experience of QR-supported activities. Select samples where the research has acknowledged external funding and where it did not.

**Methods**

Combine data from HR and the research information systems to collate all author-publication pairs\(^{16}\) from the last ten years for researchers currently at the University of Cambridge (around 370,000 pairs). Filter by authors currently working at Cambridge to increase the likelihood of their acceptance to interview and to maintain the internal-to-Cambridge nature of this case study. For each pair, extract a range of publication-based significance metrics: normalized citation; Altmetric attention score; and internal REF score. Include publications that were included as the underlying research for a REF2021 impact case study in sample and make each Cambridge author on the publication a separate entry.

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\(^{16}\) A single publication with multiple Cambridge authors would appear in the data set multiple times: one entry per Cambridge author.
Sample the top three pairs for each metric for each REF2021 UOA for senior/mid/early career researchers (ECRs defined by REF2021 definition), and by gender. Do this for acknowledging and non-acknowledging publications. (This yielded 3,701 author-publication pairs.)

Randomly select from the sample to provide a balance of female and male authors, with acknowledging and non-acknowledging papers across each Main Panel. Once a UOA had been selected it was excluded from reselection. Draws that did not satisfy the stratification procedure were discarded and repeated.

Conduct semi-structured interviews via Zoom (60 mins) that are recorded and computer transcribed with Descript. Transfer transcripts to ATLAS.ti and code.

We initially planned to carry out approximately 30 interviews to achieve a saturation of viewpoints, but ultimately conducted 28. NB: The final five interviews added nuance to themes that had been previously mentioned but did not contribute anything radically new which suggested that we had achieved saturation. These included:

- interviews with prize-winning academics (6);
- interviews with academics who had multiple significant publications that did not appear to acknowledge funding (to pilot this approach) (2);
- interviews with academics identified based on their significant publications (16), and;
- short conversations with academics on specific topics which were not explored in the longer interviews (5).

**Reflections**

- Stratification effectively balanced gender and seniority and was a necessary step to identifying interviewees, as the University population of researchers is not evenly split by gender or seniority.
- Researchers could generally describe how their particular ideas developed after their initial conception, and, in general terms, how their new ideas emerged – for example, ‘in discussions with research users: They often found it more challenging to remember the conception of a specific idea.
- Response rate was lower than interview invitations to prize-winning academics: 40% (16 interviews from 40 invitations). Follow-up emails were needed in most cases.
- The REF definition of Early Career Researcher (ECR) is too ‘early’ to be useful in this context. Most ECRs were not in permanent positions thus didn’t benefit from many researcher-scale aspects of QR. Many of the ideas that were identified through papers of ECRs were the suggestion of supervisors or more senior collaborators (who we did not interview). Mid-career researchers could still recall their time as an early career researcher.
- Interviewees tended to see us as fellow researchers and were very candid about the challenges of research and their experiences.

**Interviewing University administrators**

**Aim**

To provide an understanding of University finances, processes and procedures which may not be immediately evident to the academics we interviewed.

**Methods**

The interviewees were identified through the University of Cambridge Research Office and approached by email. The interviews were largely unstructured with a focus on the issues a particular interviewee was likely to have knowledge of. This process included interviews with Research Office staff, HR personnel, and School Finance Managers.
Reflections

- Interviews provided valuable insights into local policies and practices which often weren’t standardised across the University.
- Interviewees saw us as employees to the University which made them more willing to talk to us and be more open in their answers.

Identifying publications which do not acknowledge external funding

Aim

To identify and investigate the research and ideas that were more likely to have been supported by QR – i.e., less likely to have been supported through external funding, particularly in areas where external funding was more common.

Methods

Use funding acknowledgements recorded in an external literature database (Dimensions) alongside internally held grant-publication links to select papers that do not acknowledge funding. As QR funding is not generally acknowledged, this would give a sample of papers likely to be supported by QR/internal resources.

To test this approach, we manually reviewed a sample of 300 publications to test the accuracy of funding acknowledgement information in our databases (we selected the ten most highly cited publications from each UOA, with additions for the 26 publications that could not be accessed). Of the publications that could be accessed, 91% were journal articles, 4% conference papers, 3% books and 2% chapters. Eighteen of these publications had funding links recorded in the University internal database. For the publications where neither Dimensions, nor the internal database, showed a funding link, this information appeared to be accurate 70% of the time when we manually checked publications (i.e., we could find no funding acknowledgement in the full publication). This accuracy varied by panel as shown in Figure 5.

Figure 5: Accuracy of absence of database funding acknowledgements and links
We interviewed nine researchers about ten papers which were selected because they did not appear to acknowledge research funding. In seven cases this research was internally supported, in two cases data had been previously collected with external support but was being reanalysed, and in the final case the research was commercially supported.

Reflections

- The method provided an enriched sample of papers that did not depend on external funding and was approximately 70% accurate in relation to what was stated on the paper. The sample of nine interviews about ten papers suggested that the acknowledgements on the paper are around 70-90% (seven to nine out of ten) accurate depending on how broad a definition of external support is used.
- Both Dimensions and internal records revealed funding links for papers. Of the approximately 153,000 publication/author pairs examined, Dimensions recorded 66,000 with funding acknowledgements. Internal University records showed 82,000 as linked to a grant, of which 24,000 were links not recorded in Dimensions (Dimensions had 8,000 links not included in University records).

Analysing HR data on sabbatical patterns and associated publication patterns

Aim

To explore if it is possible to link changes in publication rates with sabbatical timing, since sabbaticals are one of the research activities most clearly linked to QR with no link to external funding.

Methods

Combine the data from HR and research information system to collate information on around 2,300 researchers who took around 5,200 sabbaticals over a ten-year period (2010-2019) with their publication outputs. Calculate the offset of each publication from the periods of sabbatical leave and calculate the frequency of each offset in the overall dataset. Test for differences in the publication rate by offsetting from sabbatical.

Reflections

- Database limitations restricted any possible analysis as the vast majority of books were recorded as being published in the January of each year. This made a month-by-month analysis impossible, and the yearly analysis did not detect an effect.

Analysing patterns in the use of bridging funding between fixed term contracts

Aim

To quantify the extent to which QR funding is used to bridge salary support for researchers and support staff between grants.

Methods

Process ten years' of HR data to identify cases where the salary of a member of staff has moved from being supported by a grant to the Chest and back to a grant.

Reflections

- The range of sources of support and the complexity of their links to individuals meant that we needed to work with HR to understand and process the data and extract meaningful conclusions.

Analysing continuity of grant holding by researchers

Aim

To identify how researchers' portfolios of grants varied over time and if researchers who held grants
also had times when they were not holding grants. If breaks in grant holding occurred, then QR would be playing a role in supporting researchers across these periods.

**Methods**

Match the data from HR records (to determine employment status) with Principal Investigator (PI) data on grant holding (to determine periods when external research funding was held).

**Reflections**

- This approach required the linking of HR data and grant data which each use different individual identifiers.
- The PI data was not completely reliable and the co-investigator data was even less so. (When a grant is initially entered into the database, there are instances of administrators being recorded as the grant holders. This information is often not updated and is more prevalent further back in time). Therefore, only PI data was analysed.

**Attempted methods**

The methods listed below were considered, or attempted, but were considered impractical or unfeasible within the time and resource constraints of the project.

**Analysis of sabbatical application forms**

**Aims**

To provide an overview of the purposes which academics state they are taking sabbaticals for, and to supplement the smaller sample of academics available to interview.

**Intended methods**

Extract and collate the information from sabbatical application forms held centrally in HR or in departments. Code and classify the stated reasons.

**Difficulties**

Obtaining data in bulk from central HR was not feasible because the forms were held as scans, and there was not sufficient HR resource to separate confidential information from academic reasons for sabbaticals. Some University departments also provided records of staff sabbatical applications, but these proved to be incomplete when compared to central HR records.

**Investigating any discernible differences between the types of individuals in fixed-term fellowship positions versus lecturers on permanent contracts.**

**Aim**

To test if there are detectable differences between the demographics of – or the research carried out by – researchers at a similar career stage but in a different contractual situation, e.g., QR supported permanent posts versus fixed term external fellowships.

**Intended methods**

Identify cohorts of early career researchers on fixed term contracts or who are junior lecturers and compare their demographics and publications using bibliometric indicators.

**Difficulties**

Because of the collegiate structure at the University of Cambridge, many early career researchers are college junior research fellows who are not recorded in the central HR system. This meant that building a comprehensive set of early career researchers with consistent demographic data across the University was not feasible.
Understanding the uptake and impact of the Returning Carers Scheme

**Aim**

Explore the impacts of the support provided by the Returning Carers Scheme, which is supported by institutional discretionary funding (which QR contributes to) and aims to help researchers returning from periods of caring responsibility.

**Intended methods**

Interviews and/or comparative analysis of publications.

**Difficulties**

Because of the personal sensitivity of the situations supported through the scheme, we could not be provided with details of its beneficiaries, or those who had returned to work without the benefit of the scheme (who could have acted as a counterfactual).

Analysis of support for interdisciplinary research

**Aims**

To understand if interdisciplinary research has a different profile of support to disciplinary research. For example, is it more likely to be supported by QR because much external research funding has a disciplinary focus?

**Intended methods**

Determine the rate of funding acknowledgement in outputs that were nominated for submission (but not necessarily submitted) to more than one UOA. Compare these rates with the rate of acknowledgement in each of the nominating UOAs.

**Difficulties**

The analysis indicated that papers nominated for more than one UOA were almost always more likely to acknowledge funding than those from either of the nominating UOAs (for all pairs except the single paper nominated by both Psychology & Psychiatry and History). Key problems with this analysis are: the narrow definition of interdisciplinary (i.e., only cross-UOA publications); the small number of outputs nominated for more than one UOA (only around 400 which did not include all UOA combinations); and that UOA combinations were often only represented a small number of times. We were also concerned that the perception that interdisciplinary research does not score well in the REF might have led to an unrepresentative selection of interdisciplinary research.
Findings: key activities and features enabled by QR

This section introduces the key activities and features we identified as enabled by QR and describes some of their characteristics, before we describe their impacts in the next chapter.

Sabbaticals

Sabbaticals are times when academics are released from most of their teaching and administrative commitments. They are a research activity without a link to external funding so are one of the most visible examples of researcher-scale activities supported by QR. Sabbaticals at the University of Cambridge are accrued by University Teaching Officers (UTOs, tenured or tenure-track academics) at the rate of one term every seven and are generally taken in blocks of one to three terms. Researchers have enormous freedom over how to use their sabbaticals and although they must be approved by the Head of Department and the Faculty Board, this approval is largely an administrative process, not determined by a judgement on how the academic wishes to spend their sabbatical. Sabbatical behaviour differs across the Main Panels; shorter sabbaticals are much more common in Main Panels C and D, and in Main Panel A many sabbaticals are not taken (see Figure 6). Main Panel A includes clinical academics who often struggle to take sabbaticals because of the challenge of managing both teaching and clinical responsibilities in addition to their research portfolio.

Figure 6: Distribution of sabbatical duration by Main Panel

Data on sabbaticals taken 2010 – 2019 from HR system export, durations rounded to the nearest month
Combination of teaching and research

The vast majority of academics at the University of Cambridge are involved in both research and teaching. Many of the academics we interviewed considered teaching to extend to supervision of Masters and PhD students. It was generally agreed that sabbaticals were key to allowing periods of uninterrupted time to maintain and develop their research and allow this combination of teaching and research in the one role. Many academics in Main Panel A combine teaching, research, and clinical responsibilities on a weekly basis.

Support of salaries

QR is a key source of support for academic salaries that provides permanence of employment. In Cambridge, many professorial posts are endowed, and although this is a completely different model of support to QR, it provides the same benefits of permanence and eligibility for such benefits as sabbaticals.

In addition to permanently funded salaries, QR funding can support academic and support staff salaries between periods of grant support to ensure that they retain employment.

Internal seed grants

QR funding can be used to provide small seed grants to develop research. The awards are given within the institution, so there is less requirement for due diligence on applicants which reduces the transaction costs and makes the provision of smaller grants more feasible.

We identified the following internal seed grant schemes (this is not an exhaustive report of such schemes available to University researchers): Cambridge Humanities Research Grants Scheme (CHRGS) administered by the School of Arts and Humanities and the School of Social Sciences; a scheme administered by the School of Technology; and the Research Networks Annual Competition administered by the Centre for Research in Arts, Social Sciences and Humanities.

Reduced teaching load and financial support for early career researchers

Early career researchers, like new starters in any endeavour, face challenges compared to their senior colleagues. Early career academics need to generate new teaching materials from scratch for the first time alongside setting up their research. In recognition of these challenges, departments often offer reduced teaching load or start-up funding to help early career researchers gain momentum. These benefits can also be used as recruitment incentives, although this was not mentioned in the case of the University of Cambridge.

Start-up funding can be spent at academics’ discretion for research supplies, travel to conferences or fieldwork, or employment of research assistants.

At the University, these forms of support vary at the discretion of the schools, faculties, and departments.

Interdisciplinary networks

Recognising its strongly departmental structure, the University of Cambridge has a programme of support for research networks aiming to build links between departments and schools. These include Strategic Research Networks (SRNs), Strategic Research Initiatives (SRIs), and Interdisciplinary Research Networks (IRCs). These networks are intended to address large-scale multi-disciplinary research challenges and strengthen research collaborations while providing a basis for funding applications. The continuing funding for these initiatives suggests that the University views them as successful. However, a detailed evaluation was beyond the scope of this project.
Findings: key benefits of researcher scale QR

This section describes the specific aspects of the research system that QR funding enables. Building on the activities supported by QR reported in the previous chapter, this section outlines how these activities contribute to a productive research environment from which new ideas can emerge. Specifically, it details how new ideas can be supported from conception to the level of maturity at which they are clearly defined enough to become a viable grant application. Finally, it looks at how some disciplines which do not rely so heavily on external funding to support mature research ideas use the infrastructure provided by QR to support the whole spectrum of the research enterprise.

QR provides – in all disciplines – the foundational environment for the conception of new ideas

New ideas come from a variety of different sources. While there is a widespread image of the lone genius pondering waiting for a singular ‘eureka’ moment, there is a growing awareness that this is not how many ideas are generated (Johnson, 2010; Grove, 2021; Leyser, 2021). Dame Professor Ottoline Leyser, Chief Executive of UK Research and Innovation, suggested that the ‘myth’ neglects the reality that ideas come from a diverse community of contributors (Leyser, 2021). Ideas may come from discussions with collaborators when one pattern of thinking intersects with another, or emerge from slowly chipping away at a problem rather than by sudden revelation (Johnson, 2010).

QR funding is a complement to project funding as it enables a stable research environment in which the generation and testing of ideas can take place. QR contributes to this environment in a number of ways including: allowing academics to combine teaching and research activities effectively; supporting early career researchers; and providing job security for academics. The following three sub-sections elaborate on these themes.

Involvement in teaching keeps researcher expertise broad and current

In most cases, tenure-track university academics manage their own research portfolio in combination with a set of teaching responsibilities for undergraduates and post-graduate students. While there has been some literature investigating the extent to which the combination of teaching and research (the teaching-research nexus, as it is described in the literature) produces reciprocal benefits (Marsh and Hattie, 2002; Taylor, 2007; Stappenbelt, 2013; Daumiller and Dresel, 2018; McKinley et al., 2020), most of the academics whom we interviewed mentioned positive consequences of being involved in teaching alongside research.

One of the most consistent themes shared by academics across different disciplines was the belief that their teaching commitments force them to read outside their areas of research expertise. One academic spoke about feeling obligated to keep presentations to students updated with the most recent literature year on year. This led them to spend more time reading than they might otherwise do, despite recognising its intrinsic benefit. In essence, teaching "stops you from forgetting all the things you learned as a student".

In particular, being involved in teaching requires academics to have a sufficiently deep understanding of the material in the curriculum to be able to teach
it. One academic told us: “Teaching has required that I covered a much wider range of theoretical issues than I might otherwise have done, [thereby] becoming interested in those open new avenues.” Another academic mentioned that the benefits of being involved in teaching include: “it helps [me] clarify the arguments, the cause and effects, the linkages and sets up clearly in [my] mind what it is that [I am] saying”.

Academics also felt their teaching is improved by being involved in research. They talked about how incorporating their research into the curriculum “excites the students,” “fosters creativity in the students,” and that it benefits the students to see “where knowledge is being produced actively and how it’s being produced”. Some academics explained how their research ideas arise from a dialogue with others which requires ongoing engagement with other people and other texts, suggesting that – at least in some disciplines – research would be hampered if it were done in isolation.

A smaller number of researchers reported on the tensions between research and teaching. They felt that they could be rather separate activities which did not inform one another and that “sometimes it does feel like [teaching] takes time away from my research”.

Academics noted that there is a distinct difference between being able to teach in more specialised topics that align with one’s research agenda compared to teaching first-year undergraduates. But in almost all cases, academics still reported that they enjoyed teaching at least to some extent and noted the benefit that the interaction of teaching helped them to feel more integrated within the University community.

Academics suggested that a key reason why they can effectively combine teaching and research responsibilities is because of regular sabbaticals which provide an extended period without teaching obligations. In our interviews, some academics mentioned how heavy workloads during the teaching terms make it impossible to progress their research:

“I think the administrative burden on [academics] in this University has increased to such an extent that in-term research has become impossible. Where one used to be able to plan around sabbaticals, [sabbaticals are] now indispensable. Yes, without them I could not do research, and that’s true for the vast majority of my colleagues... We’re talking about [sabbaticals acting as] lifebelts rather than flight.”

Another academic provided this perspective on how sabbaticals provide essential relief from demanding teaching workloads:

“The knowledge of having a term off is great. It puts you at ease and sometimes helps in situations [of intense teaching demands] where you think: Why am I doing this? [Knowing a sabbatical is coming gives] you that light at the end of the tunnel.”

In essence, sabbaticals – a research activity closely linked to QR funding – allow university researchers to effectively combine teaching, which maintains their exposure to a broader range of literature, individuals and ideas, often the feedstock for new ideas, with uninterrupted time to conceive and explore those research ideas.

Reduced teaching commitments and start-up funding helps establish new researchers

One of the purposes of QR that is mentioned by the Merrison Report (1982) is to support the establishment of early career researchers. Supporting future generations of researchers is an important aspect of building a sustainable research enterprise. The flexibility provided by QR allows universities the option to dedicate funds to emerging researchers.
who may not yet be able to compete on level footing with more senior academics who have more experience winning grants and managing the many demands of teaching, research and administration.

Early career is a challenging stage to be a researcher. One senior academic provided the following example:

“I think definitely the first few years as an academic were very difficult, just because you are trying to start your research career but also trying to develop new classes and so on. I have a former postdoc who’s just started a lectureship. I did warn him. He had just gotten some very nice fellowship and decided to take this lectureship at another university instead. [He’s currently experiencing] a difficult time.”

We asked interviewees if there were any forms of support they received or were aware of being directed at junior colleagues. The form of early career researcher support we heard about most was the conscious effort of departments to give early career researchers a reduced teaching load. One senior academic said:

“There’s definitely a plan not to dump a huge amount of teaching overnight on anyone. [When I was early career] I had a conversation with the deputy head of the department of teaching where my entire future teaching load was outlined [with] a kind of programme for how it was going to be ratcheted up each year. It was explained to me.”

Another mid-career researcher noted:

“I think having [a significant] grant and really having the sabbatical were absolutely central for me. I think I had not had either of those, it would have been difficult – without a postdoc – to really come up with sort of mature ideas of my own, rather than just sort of keeping up with the field as it were.”

In addition to a reduced teaching load, many departments provide start-up packages of a few thousand pounds\(^\text{17}\) that can allow early career researchers to acquire personal infrastructure for their research, hire a short-term research assistant, start a pilot project, and/or provide some travel funds to attend conferences. Academic and administrative staff indicated that departments have discretion over what start-up packages they offer to early career researchers and that start-up packages may be offered to more senior new recruits as well. Because of the level of discretion and local record keeping, it was not feasible to quantitatively analyse this provision or to provide an overview of the scale of support provided.

The University has recognised that such initial support has traditionally been even less developed for non-tenure track early career researchers – including postdocs, which make up 35% of the University’s staff. To address this, the University has invested in a Postdoc Academy, which provides professional development opportunities and a social network for building community across disciplines. It was beyond the scope of this project to evaluate this institution scale initiative although a number of early career researchers mentioned that these forms of support were helpful and appreciated. We spoke to a few researchers who were in fellowship roles which are much more focused on research (in many cases, teaching is only done in small quantities and on the basis that it is good for professional development). While many of these are prestigious positions, some interviewees noted it can be an isolating experience without those links to the University that teaching provides.

One challenge we encountered in investigating the effect of QR’s impact on supporting early career researchers has been the lack of clear counterfactual evidence around these interventions, particularly because we could not develop an effective way of developing comparisons.

\(^{17}\) The value of start-up packages seems to vary across discipline, year and individual, but they seemingly can range from £10,000 to £50,000.
Figure 7: Percentage of posts bridged by QR

Percentage of bridging calculated by taking number of staff moving from grant support to Chest support and back again, over a 10 year period from 2010 to 2019, divided by the average of the number of fixed-term department posts in 2010 and 2019.

Figure 8: Length of bridging support by Main Panels

Length of time staff are supported by Chest funding between two periods of grant support; data extracted from HR database from 2010 to 2019.
The future success of the research enterprise depends on the youngest generation of researchers successfully maturing into fully capable academics, proficient in research, teaching, networking, mentoring, grant writing, administration and more. QR’s discretionary nature allows university departments to gradually ease early career researchers into the multifaceted demands of academic life.

Permanent research contracts and bridging funding between fixed-term contracts enables expertise to be retained

Solely project-based research support would provide an insecure, short-term contract-based work experience for all researchers. We examined whether QR provides increased security for those researchers who are funded from project funds and how researchers on permanent contracts would be affected if QR was not there to provide their permanence of employment.

Many research staff are employed on fixed-term contracts associated with research grants. QR funding provides the opportunity to retain these staff – who may have built up valuable skills and expertise – within the University over the period between research grants requiring those skills. Taking the average head count of each Main Panel between 2010 and 2019, we can see that the fraction of staff benefiting from bridging declines across Main Panels: it is highest in Main Panel A at over 8% and decreases to 2% for Main Panel D (Figure 7). This trend likely reflects the lower rate of grant holding in Main Panels C & D. This is likely to be an underestimate of the role of bridge funding as researchers could also be transferred, for short periods, onto grants with surplus funding available to achieve a similar bridging effect.

The majority of posts are bridged for less than a year, as shown in Figure 8.

Figure 9 shows that the bridged research positions are predominantly support staff and junior roles (Grade 9 is the grade equivalent to lecturer and lowest grade where research independence is common).

One School Finance Manager talked about this bridging practice and how discretionary funds were also used to allow for short extensions to postdocs or other research staff on fixed term contracts. They explained how some of these exceptional researchers become more embedded in their department and have institutional knowledge that can be put to good use. For example, bridging funds can be used so that a postdoc can stay for a few months and work on a grant application or an application for an interdisciplinary research network.

A second way to quantify the value provided by the long-term stable salary support provided by QR is to examine the fraction of researchers who, although they led grants at some points, also had periods when they were not leading grants (on the assumption that the salary support provided by QR supported these periods without grant holding). To examine this, we looked at which researchers were the Principal Investigators (PIs) on grants for ten years from 2010 and 201918.

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18. This analysis should be considered indicative as there were some inaccuracies where administrators were recorded as the PI in the internal records. Unfortunately, it was not feasible to include co-investigator data as this was not sufficiently accurate.
Figure 9: Distribution of grades of posts bridged

Grade of staff supported by Chest funding between two periods of grant support; data extracted from HR database from 2010 to 2019

Figure 10: Fraction of time grant-holders have grant funding

Violin plot showing distribution of how much time researchers lead grants in each panel over the period 2010 to 2019. In 'Med, hlth & life sciences' the violin is widest at 100% showing that the largest number of researchers led grants 100% of the time, however there are still some researchers, at the bottom of the violin, who never led grants.
The analysis showed that even in the areas with the highest level of grant holding (Main Panels A and B), more than 50% of researchers had gaps during which they did not lead grants. In Figure 10, all of the researchers in each Main Panel are vertically distributed to demonstrate the proportion of their time over the last ten years which has been supported by at least one grant. For Main Panels A and B, there is a clear bulge at the top showing that many researchers hold grants 100% of the time, but there are many researchers who have gaps in their grant holding. Breaking down this analysis by grade illustrates that the support provided by QR is more important for researchers at lower grades as they are more likely to have gaps in their grant funding. For example, Figure 11 shows that more than 40% of lecturers and equivalent across all UOAs have gaps in their grant holding. The fraction of researchers with a gap in grant holding falls particularly in Main Panels A and B for readers and professors.

QR contributes to supporting researchers between their periods of grant funding both directly for those who are employed on grants, and indirectly for those leading grants. It decreases instability for those employed on grants and maintains expertise developed through grant funding. Alongside this, QR also supports PIs as they develop into more experienced researchers and reduces the need for them to have continuous grant support.

**QR is key in all disciplines to supporting the incubation of new ideas**

Once an idea is born, it needs to be challenged to determine whether it has a future. Research councils and other funders provide grants to support discrete projects which have a clearly defined scope and reasonable chance of yielding worthwhile results. This means researchers must dedicate resources before they apply for a grant to develop their ideas to a maturity that allows them to be articulated in a funding application.

Researchers with new ideas require time to develop them, supplies for experimenting, libraries for investigating, and colleagues to challenge and encourage them. Researchers get these essentials through regular sabbaticals to rejuvenate their research portfolio; seed grant funding to gather pilot data; time on sabbaticals to finish off projects and appropriately place them in context; and interdisciplinary research networks.

The following four sub-sections elaborate on these provisions in turn.

*Providing uninterrupted time allows for the exploration of new subject areas and testing of novel ideas, which may lead to new research directions*

One aspect of breaking down the conventional notion of ideas occurring to people in instantaneous ‘lightbulb’ moments involves accepting that often ideas are developed more in a pattern of ‘slow hunches’ (Johnson, 2010). Careful consideration of the limitations of a new idea can be challenging to do without a depth of time to allow for wandering thoughts. There may not be a plan as to where the investigation should travel. This can make it challenging to know how to progress a new research idea with discrete one-hour blocks of time between teaching and administrative responsibilities.
Figure 11: Fraction of researchers with a gap in grant funding, by grade

Analysis of grant PIs for grants from 2010 to 2019 showing fraction of PIs of each grade in each UoA who have gaps when they are not PI for a grant.

Figure 12: Publication rate post-sabbatical period by month from sabbatical start

Normalised publication rate in the months following the start of a sabbatical for the five most common publication types, for all researchers taking sabbaticals from 2010 to 2019. January publications excluded because of data quality concerns. Normalised publication rate calculated for each month fitted using a local smoothing (local polynomial regression implemented as loess).
The academic interviewees who had access to regular sabbaticals discussed how valuable it is to have large blocks of uninterrupted time to progress their new ideas and conduct categorically different kinds of investigation. One academic explained:

“I can’t normally do these activities unless I’m on sabbatical] because I don’t get uninterrupted spells of time to think. My day is just broken up into one-hour or two-hour slots of doing stuff, and it’s very targeted. The value of just uninterrupted time to read and go follow down rabbit holes and expand…I don’t have to be strategic in how I’m deploying my time. [Being on sabbatical] felt like being a PhD student again, where research is fantastic.”

A researcher from the humanities suggested that even standard research projects require at least some uninterrupted time to develop new ideas which suggests that it is not a luxury, but a necessity:

“I think [the sabbatical] gave me the [time to] go back to my data and really ask grounded questions. [Our discipline emphasises letting] the data determine your questions rather than starting with a question. The question changes because what you find is not what you could have predicted. So, I think that the ability to go back to the data and sort of ask in an honest way: ‘what actually is significant about this?’, that’s something that takes months or years to do.”

Some researchers mentioned using sabbaticals to travel abroad to do fieldwork, meet with collaborators (sometimes for an extended period of time and teach), and attend conferences. These activities would not be possible without a period of dedicated research time like a sabbatical where distractions are limited. But even without travelling, the dedicated time to travel down “rabbit holes” in a non-goal-oriented way is reportedly an important source of new ideas.

One researcher specified how simply having time to develop 'blue skies' research ideas – which can be done without other research costs such as a research assistant. The time allows for contribution to areas of research which are not favoured or are 'unpopular' for external funding but are still valuable avenues of inquiry to contribute to the discipline:

“What [external funders] tend to want to do is policy related. And there are no non-ideological answers to that, and I’m just not really that interested in going down those kinds of rabbit holes. What I want to do actually is much more reflective and ‘blue sky’: theoretical but applied to policy. There are not huge amounts of funding interest in that.”

Another researcher reported how two terms of sabbatical were used to write a popular science book and explained the motivation to do this:

“I wanted to write a book about [my research programme] as a synthesis of quite a big literature. And then I thought there’s no point in spending ages writing this if about 12 [experts] read it, [and] because it’s exciting and interesting to a broader audience...[The project] took longer than I expected because I’ve had to learn how to write for a different audience. But I found it incredibly rewarding, and it has transformed my teaching upon return - my teaching skills have [improved].”

After hearing from the interviewees about how they use sabbaticals, we combined the data on the timing of all University researchers’ sabbaticals and their publication record to look for changes in the numbers of publication after sabbaticals. In the months after the start of a sabbatical, there is a strong suggestion that the rate of working paper publications increases (Figure 12). This analysis adds weight to the idea that sabbaticals allow the generation of new ideas. There is also evidence of a slight increase in the rate of book and chapter publications during the months following a sabbatical; however, we suspect that that does not represent new ideas, but the completion
of previous work. Researchers mentioned this as an additional benefit of sabbaticals. One researcher who has not yet been eligible for sabbatical told us: “I’ve got loads of unwritten up papers where some of the analysis has been presented at a conference, but I haven’t had time to write in a journal article. So, when I get the sabbatical, I’ll try and write up some of those.”

However, when we looked at a yearly timescale (Figure 13), we could not detect an increase in publication rate. We suspect the effect disappears at the 12-month scale because the process of book and article publication is long enough and variable enough that any signal is lost in overall noise in the data; it may also be complicated by periods of externally funded research leave.

Our ability to see the effects of sabbaticals in the quantitative data was hindered by inconsistent publication date recording, our relatively crude analysis, and the long and variable time-lag to publication. Despite these challenges, we detected suggestions of the positive impact of sabbaticals. In contrast, researchers consistently provided examples of how the uninterrupted time and freedom to think ‘around the subject’ was central to their ability to conceive significant and innovative research ideas and develop and nurture them.

Figure 13: Publication rate post-sabbatical by year from sabbatical start
Providing an incubation phase for new ideas allows ideas to become competitive for external grant support

As explored in the previous section, research councils fund research that has a defined scope and a reasonable chance of yielding worthwhile outcomes. Some investment of time and resource is needed to see nascent ideas through to the level of maturity that they may be eligible for such grant funding. One way that academics can receive support to trial new ideas is through internal, small-scale seed grants. Having a set of pilot data can be essential for any success with a grant application. Moreover, academics told us that it can be frustratingly difficult to find opportunities for small grants since they are not commonly offered by research councils.

One researcher told us: “A small grant from, say £3,000-5,000, can [be the] difference between a research project and no research project.” They noted that research councils tend to not offer small grants because the burden to benefit ratio is too great, but not all worthwhile research would be appropriately funded by large grants. Limited research into the use of small grants has shown that they can have distinct benefits for researchers including increasing the scientific yield (more projects can be funded with the same amount of money), promoting interdisciplinary research, and supporting more innovative research than larger grants (Caddell, Hatchette and McGrath, 2010; The British Academy, 2016; Dimke et al., 2019).

Some schools within the University of Cambridge provide internal seed grant funding. The School of Humanities and Social Sciences runs the Cambridge Humanities Research Grants Scheme (CHRG), which offers three tiers of grants of up to £1,500 in one tier and up to £20,000 in another. These grants are funded on the basis of peer review, but after that preference is given to early career researchers. Other Schools offer internal seed grant funding, including the School of Technology which typically offers a total of £80,000 per year to five to 20 academics, with larger awards for academics working in strategic areas.
A number of other small grants can be found around the University which are not linked to a specific school. For example, the Centre for Research in the Arts, Social Science and Humanities (CRASSH) offers £1,500 per year, administrative assistance, and a venue for convening a research network. Cambridge Digital Humanities (CDH) provides funding of up to £1,000 for the creation of digital resources in support of digital humanities research. Given the decentralised nature of the University of Cambridge, this is likely to be a non-exhaustive set of examples of seed funding.

Small grants of under £5,000 are not appropriate for all disciplines, but the academic interviewees in arts and humanities reported how these grants had been used for providing catering for an inaugural conference (attendees paid for their flights and accommodation), updating a project website to boost impact, and hiring a research assistant (typically former students) to do 70 hours of data entry.

Academics we interviewed who had experience with these programmes mentioned that: “It's still a lot slower and more inefficient [to do all of the research by myself during term time]. I would still at least try and apply for a [few] couple of thousand-pound grants here and there to get a student to do some measuring or something like that. I once had a CHRGS grant for £8,000 or £10,000, which pays for a small amount of casual research assistance and some participant [incentive] money as well.”

All grant review processes are subject to the dangers of conflicts of interest and other biases. Having internal funding schemes provides an alternative to external schemes with different conflicts of interest and biases, which may help to promote research diversity and reduce external biases. One interviewee felt that because internal schemes had reviewers from different disciplines (to avoid personal conflicts of interest within the small pool of researchers in any specific discipline) they provided an alternative to the external schemes where their work was considered unfashionable by senior researchers of the same discipline.

At Cambridge, there are other sources of small amounts of money for specific research related endeavours (such as conference travel) including departments and colleges. We have not systematically studied this across the University, though the practices are likely to vary by discipline, college, and individual.

Small scale funding that is quickly awarded and easy to apply for allows researchers to take the next step in developing and honing their research ideas. In the absence of external funders providing this, QR provides support that can be used to allow universities to provide such funding internally.

**Providing time to situate research findings in their context or to map the current state of a research field allows researchers to identify appropriate next steps**

We examined whether researchers tend to acknowledge funding more or less on particular types of publication. We wanted to test the hypothesis that publications like reviews might draw primarily on researchers’ time that was supported through QR; whereas, their research articles might be supported from external resources in addition to the their time. In clinical medicine and the biosciences, we found that reviews did acknowledge funding less than primary research articles. Our interviews suggest that this is sometimes because QR supported the time to write reviews, and sometimes because of the complexity of acknowledging funding from multiple review authors. Interviewees gave three reasons for writing reviews: to establish the state of knowledge to inform treatment approaches; to establish the state of knowledge to enable new research; and as training for early career researchers in critical evaluation of research. This suggests QR plays a role in supporting the synthesis that solidifies the foundations of fields and another aspect of the development of early career researchers.

This analysis was complicated by establishing whether any observed differences related to: how the research was supported rather than culture/practice linked to the type of output; or the ability of literature databases.
to capture funding acknowledgements from that type of output. For example, it may be standard practice not to acknowledge funding on conference presentations, or perhaps literature databases less effectively capture such acknowledgements. For these reasons, we focused on the types of outputs that are published in the same venue – namely articles, reviews and systematic reviews – that are all published in journals.

When we tested the difference in acknowledgement behaviour between articles, reviews, and systematic reviews, we found highly significant differences in acknowledgement behaviour between reviews and articles only in UOA 1 and UOA 5 (p = 1x10^-9 and 4x10^-4 respectively). Reviews were 1.7 and 1.6 times less likely to acknowledge funding, respectively. We also compared systematic reviews to articles where UOA 1 had the clearest differences. Systematic reviews were also less likely to acknowledge funding than articles in general but because of the small number of systematic reviews, the p-value suggested the difference observed could have occurred by chance.

One researcher told us that their research ideas come from both working as a partner on a larger grant and through dedicated time working on their own book. They confirmed that the book serves to both synthesise various threads of research and generate new strands of research. In doing both activities in a single book it takes a long time: “I think it has only happened in the last few months that I’ve thought, Actually, this could go somewhere. In terms of sort of new ideas, it has taken me several years to get to that point. If I had sort of pushed through and published the book earlier, then I think I might look up to that stage.”

Taken together, these strands of evidence suggest that QR supports researchers drawing together different strands of research and carrying out reviews that summarise the state of play in particular disciplines. However, we were unable to explore why we might not have seen that effect in other disciplines.

Providing a counterweight to discipline-specific structure of university departments and external funding supports interdisciplinary collaboration

It is suggested that the most pressing global challenges will need to be addressed by interdisciplinary research-based solutions (Bothwell, 2020). This idea is reflected in UKRI’s Global Challenges Research Fund (GCRF) which specifically supports interdisciplinary research to address the challenges faced by developing countries and the United Nations’ Sustainable Development Goals19. However, observers suggest research councils and charities tend to fund research that falls within their own specific disciplinary remit, and interdisciplinary research can miss out on funding from traditional external sources unless there are explicitly challenge-based calls for research (The British Academy, 2016).

QR funding supports interdisciplinary research at the University of Cambridge by providing avenues for supporting researcher-led proposals for research networks. These networks enable spaces for research staff from disparate parts of the University to discuss a common area of interest.

With the University of Cambridge’s Strategic Research Initiatives (SRIs) and Strategic Research Networks (SRNs), the University offers £55,000 per annum, which can pay for the salary of a coordinator who provides administrative support and organises events for the network. Some SRIs and SRNs can mature into Interdisciplinary Research Centres (IRCs) which are expected to be financially self-sustaining. The University hopes that these interdisciplinary network activities provide the baseline infrastructure, leverage, and momentum that academics need to apply for external funding to build up the research base. Further, these interdisciplinary networks provide a single point of entry for research funders or industry collaborators who are interested in academic input on a certain issue but would otherwise not know where to go.

While it is challenging to know exactly to what extent these activities might occur without the dedicated funding, the value of these activities is demonstrated in their continued investment. Unfortunately, a full evaluation of these interdisciplinary networks is beyond the scope of this project. However, we interviewed several academics who were involved, to various degrees, with these programmes, and had many positive experiences with them.

One academic noted how challenging it can be to make any – much less meaningful – connections with colleagues in other parts of the University, and how the interdisciplinary network programmes address this key challenge: “We need a research facilitator to be in post and scoping out the work. There’s a lot of work that’s already done in this research area across the collections that we don’t know about as a collective. It’s hard to move that way in Cambridge.”

Another researcher noted how expertise was fragmented across the University saying: “There has been a lot of scope for trying to connect those people together. If this IRC didn’t exist, that would be a lot more challenging.” A few academics mentioned being a member of an SRI “peripherally” and that the network has not changed the course of their research but appreciate that the whole purpose of the programme is to see whether there is a critical mass to develop ideas with colleagues across Schools further.

The interviews showed one of the ways in which external funding, which is often discipline based and aligned with disciplinary university structures, can be complemented by supporting researchers to work across disciplines through activities supported by QR.

In the arts, humanities, some social sciences, and other theory-based disciplines such as mathematics and computer science, QR often supports the entire research endeavour

It is clear that the nature of research funding varies between disciplines, and this was reflected in our interviews. In disciplines where there are few, low, or no research expenses beyond a researcher’s time and basic university infrastructure (such as the Library), a greater variety of kinds of research can be conducted without needing the external funding leg of dual support. QR fully supports a researcher who we spoke to in the arts, who sometimes makes use of archives: “but a lot of stuff is online or nearby [in London] which doesn’t require travel around the world. And I’m not doing ethnography so I don’t need to travel for field work and such. A lot of [my research] is covered by day-to-day living expenses.” This account provides an example of where QR’s provision of a salary for researchers is sufficient to cover almost all expenses.

Even in disciplines beyond the arts and humanities, interviewees said that the necessary infrastructure needed to conduct research was provided by their department. A researcher in computer science explained that the work supporting the high-quality publication we identified: “was all computational [machine learning] experiments...on Microsoft Azure cloud computing. It is specialised equipment - not something a normal laptop could run. It’s definitely a resource that a number of Master’s students take advantage of to run their experiments.” This comment provides an example of where the QR block grant is covering both the time and infrastructure needed to conduct research, allowing for an expansion of knowledge without the need to apply for external funding.

By contrast, we heard from academics in the medical sciences that the role of QR is not as obvious to researchers in these areas – despite the salary and administrative support that it provides: “I am very sorry to confess that the QR system, for a medical scientist, is in the main an arcane mystery... it one of
those advantages I expect that one does not value until it is removed."

Interviewees in these disciplines suggested that research can only occur with external grant funding because of its expense; one commented: "Clinical research is so expensive and challenging. Naturally the proper study of diseases and normal processes in humans is in volunteers and patients; but there are formidable costs and stringent regulation, such as Good Clinical Practice (GCP) training, as well as laborious requirements to secure the ethical permissions and conduct research on living subjects in safe, adequately staffed, and approved facilities. Newer molecular and especially gene therapies, for example, will never be approved without extensive testing in living animals. The costs of this work, even initial studies conducted in mice and maintaining them in high-status facilities that are free of imported infections, have increased exponentially over the years."

We can see these patterns reflected looking at the fraction of research articles from the last ten years that acknowledge research funding across different UOAs, shown in Figure 14. Research in the sciences is generally more likely to acknowledge funding with a decreasing fraction of acknowledgement across the social sciences into the arts and humanities, with computer science being a notable outlier. This analysis says nothing about whether the level of acknowledgement is consistent within disciplines. Both our quantitative and qualitative research findings showed that there was significant variation within disciplines. For example, we heard from one interviewee in economics that there is a large difference between the funding needed for theoretical economics and empirical economics. While theoretical economists look more like humanities researchers in their shorter lists of research resources to conduct their work, empirical economists require access to large, expensive datasets (on a scale of up to £100,000), as well as research assistants to undertake any research project.

To explore how acknowledgement behaviour varies within disciplines, we examined what fraction of individuals' articles acknowledged research funding. Main Panels A and D illustrate the extremes of general acknowledgement and general non-acknowledgement.
In comparison, it is notable that Main Panels B and C contain disciplines with a variety of dependence on the support of QR across the entire research endeavour (Figure 16), and even Main Panels A and D have outlying researchers.

Our interviews included nine researchers and ten papers selected because of a publication that did not acknowledge research funding. The researchers’ responses were largely in line with the conclusions from the quantitative analysis presented above, but there were some additional aspects that emerged. Main Panel A was the panel where there was the least non-acknowledging research. The first example selected was an editorial, and the second had received external funding many years before the paper was written - hence the absence of acknowledgement.

In Main Panel B, one of the publications – comprising the work of a Master’s student and the use of equipment already present in the laboratory – was carried out without external funding. Another paper was supported by an industrial partner who did not require acknowledgement which reflects the more relaxed attitude to funding acknowledgement.

In Main Panel C, one publication was commissioned to be the chapter of a new edition of a handbook, but the authors were not compensated for producing the chapter so did not acknowledge funding. Two other publications were built on research using existing data that had been previously funded and only time was needed to produce the subsequent paper for a policymaking audience.

Both publications in Main Panel D required only time and library access so could be completed without external funding.

The range of support for these interviewees’ publications is illustrative of the ways we outlined throughout this report that QR supports research more broadly as a complement to external funding. In the overall project, we identified that there are publications where QR: supports the entire research endeavour; allows a re-examination of previous data or the state of a field; and supports an environment in which novel ideas can emerge and grow.
Figure 16a (top): Fraction of researchers’ publications acknowledging external funding (Main Panel B)
Figure 16b (bottom): Fraction of researchers’ publications acknowledging external funding (Main Panel C)
Reflections and next steps

This report describes a range of researcher-scale activities supported by QR and identifies a diverse range of benefits that institutional discretionary funding allows. However, we were not able to fully examine some benefits and heard about other benefits we were not able to explore. We would therefore encourage further exploration – to improve our understanding of the contribution of QR and its complementarity to other sources of support – in these areas:

- **Understanding the ways in which administrative responsibilities – and the professional services staff who support this administration – affect the productivity of academics.** We encountered many instances of academics complaining about the bureaucracy of University procedures and that of grant application and administration. However, we suspect researchers do not see the value provided by administrative services. Indeed, in cases where such administration is working effectively, it can become almost invisible. In cases where bureaucratic requirements are beyond the University’s control by dealing with any element of them, administrators increase the amount of time researchers can spend on research. Much administrative support is underpinned by QR, so it would therefore be valuable to understand the improvement in research productivity provided by that support.

- **Refining our understanding of how sabbaticals lead from research ideas to publications.** Our qualitative research provided strong evidence of the value of sabbaticals for idea generation and development, although we were unable to find similar quantitative evidence. We suspect this is because of the long and variable timescales between an initial idea and its final publication, and the crudeness of simply counting publications. It would be valuable to consult with individual researchers to map their research trajectory and how their outputs relate to their sabbaticals by overlaying aspects such as changes of research direction. This would help to quantify the impact of sabbaticals and provide ideas about how they can be used most effectively.

- **Exploring the impact of career security on research productivity and researcher diversity.** Does the level of job security affect the nature of the research produced by a researcher and do different levels of job security attract different types of researchers? We had hoped to compare the demographics of early career researchers at similar career stages on permanent contracts with those on fixed-term contracts, but this was not feasible (see Methods section). However, it is an important question in research policy.

- **Conducting longer term evaluations of internal seed grant schemes.** The scale of this research project precluded us from doing our own evaluation of seed grant schemes. Such an evaluation would require monitoring seed grant recipients (and unsuccessful applicants, to establish a counterfactual) to determine the impact of the seed grant on the progress and impact of their research.

We were only able to examine research at the University of Cambridge, and although there are many similarities across universities, many will have their own ways of managing research income and different spending priorities. Similar analyses at other universities to examine similar aspects or use additional techniques, would help build a more robust and generalisable understanding of the contribution of QR and how it can be used.

Previous work has shown that QR provides benefits to the research system in terms of allowing strategic freedom to universities and meeting the shortfall in full economic costs of external research. This pilot study shows that there are further diverse benefits at the researcher-scale where QR is supporting aspects of research that underpin a vibrant and innovative research system.


