
**A Review of QR Funding in
English HEIs**

Process and Impact

Report to the Higher Education Funding
Council for England (HEFCE) by

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Acronyms

| | |
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| A&H | Arts and Humanities |
| BBSRC | Biotechnology and Biological Sciences Research Council |
| BHF | British Heart Foundation |
| BIS | Department for Business Innovation and Skills |
| CBR | Centre for Business Research |
| CRUK | Cancer Research UK |
| EPSRC | Engineering and Physical Sciences Research Council |
| ESRC | Economic and Social Research Council |
| EU | European Union |
| FEC | Full economic cost |
| FTE | Full time equivalent |
| HEBCIS | Higher Education – Business and Community Interaction Survey |
| HEFCE | Higher Education Funding Council for England |
| HEI | Higher Education Institution |
| HEIF | Higher Education Innovation Fund |
| HESA | Higher Education Statistics Agency |
| KPI | Key Performance Indicator |
| MRC | Medical Research Council |
| NHS | National Health Service |
| OLS | Ordinary least squares |
| PDR | Performance and development review |
| PI | Principal Investigator |
| PVC | Pro-Vice Chancellor |
| QR | Quality-related research (funding) |
| RAE | Research Assessment Exercise |
| RAM | Resource Allocation Model |
| RC | Research Council |
| RCUK | Research Councils UK |
| RCS | Research and Consultancy Service |
| RDP | Research Degree Programme |
| REF | Research Excellence Framework |
| SRIF | Science Research Investment Fund |
| STEM | Science, Technology, Engineering and Mathematics |
| STFC | Science and Technologies Facilities Council |
| TRAC | Transparent approach to costing |
| TSI | Third stream income |
| UCL | University College London |
| UoA | Unit of assessment |
| UTC | University Technology Centre |
| VIF | Variance inflation factor |

List of Respondents

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Foreword by David Sweeney

The UK has an international reputation for the strength of its research, contributing 16 per cent of the world's most highly cited research. At the heart of this is the research carried out in our universities. Recent analysis by Elsevier shows that almost 90 per cent of this contribution involves UK universities¹.

University-based research is funded from a wide range of sources. This is a real strength of our system. HEFCE's quality-related research (QR) funding is an integral part of this system, enabling institutions to maintain a dynamic and responsive research base of world-leading quality. In 2014-15 we will distribute £1.6 billion in quality-related research funding to English institutions, yet our funding is often overlooked in the dual support partnership. This report demonstrates the value of QR funding to universities across England, and offers insights into the way this funding stream is distributed and managed at an institutional level.

The important activities that benefit from QR funding are often hidden or go unrecognised. Attempting to isolate the role of QR from other funding streams is a challenge, but this shows the strength of a highly integrated system. Funding from research councils, funding bodies, government departments, industry, charities and international sources cannot be easily disentangled, working instead to create a whole which is more than the sum of its parts.

This report gives some specific examples of the contribution that QR makes to the research base in universities. More importantly, it demonstrates that QR plays both an underpinning and complementary role within this system and that it cannot be substituted. It shows that for the majority of institutions, a reduction in QR would lead to a lower volume and quality of research. It is also clear that a shift in the balance of funding across the dual support system would lead to increased uncertainty in securing funding, and narrow the spectrum of research being undertaken in universities.

A significant majority of the institutions participating in this study identified QR funding as a critically important element of the dual support system. In particular, they value:

- the stability QR brings, enabling a longer-term, more strategic approach to building research capability
- its flexible, non-hypothecated nature, allowing them to direct resources in a strategic manner, to the areas of greatest priority to them
- the role it plays in helping universities to attract and lever funding from a range of sources, and to meet the full economic costs of research, ensuring that the broadest range of funders continue to invest in research in the UK

¹ 'International comparative performance of the UK research base – 2013', report to the Department for Business, Innovation and Skills by Elsevier, available online at <https://www.gov.uk/government/publications/performance-of-the-uk-research-base-international-comparison-2013>.

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- the strategic role of QR in supporting interdisciplinary research, collaboration initiatives and the training and development of postgraduates and early career researchers, in maintaining the research infrastructure and in developing research management functions.

This report demonstrates the sector's commitment to the dual support system and its appreciation of the value of QR within that system. HEFCE will continue to work with the other funders of research and with our partners in the sector to champion dual support and to make the case for a sustained commitment to the public funding of university research.

David Sweeney

Director, Research, Education and Knowledge Exchange, HEFCE

Foreword by Professor Sir Christopher Snowden

UK higher education is rightly regarded as a world-leader, and the impact that our universities have on our own economy and society is huge. Our universities contribute £73 billion a year to the UK economy, and have been linked to 20 per cent of GDP growth between 1982 and 2005. On a wide array of measures, we are consistently found to have one of the very best tertiary education systems in the world.

A key feature of our global reputation is the excellence and diversity of our research base. The UK research community is rightly heralded across the globe as the home of quality, rigour and excellence. And yet we must consistently punch well above our weight; as a nation, we continue to invest less than our competitors in science and research, yet our successes are comparatively much greater. We are not only the most productive research base in the world, but our outputs are considered among the most important.

How we support and enhance this world-class research ecosystem is currently a matter of debate. It is my belief that an integral part of our many successes and achievements has been the research governance and funding mechanisms that have evolved in the UK.

This report highlights the critical role that QR funding plays in our research ecosystem. An aspect that clearly stands out is the interconnectedness and complementarity of the funding streams that underpin both the quality and the effectiveness of our sector. It provides evidence of the flexibility provided by QR funding as part of a wider system which has consistently delivered excellent outcomes. It also highlights how this vital resource enables our universities to make targeted, strategic investments in research that help us to maintain a broad and high quality research base – which is unlike any other system in the world.

UK research has a reputation for diversity and excellence that is respected across the globe. Our universities play a much greater role in research and development than in our competitor economies and are an integral part of this success; we must not lose sight of the fundamental role that the dual support system plays in underpinning our unique, world-leading system.

Professor Sir Christopher Snowden

President, Universities UK

Executive Summary

X1 Aims of the study and methodology

Aims

X1.1 In 2013 the Higher Education Funding Council for England (HEFCE) and Universities UK commissioned PACEC Ltd and the Centre for Business Research (CBR), at the University of Cambridge, to review the quantitative and qualitative impacts of non-hypothecated research funding (quality related research funding or QR funding) and the institutional practices and procedures for its deployment and use. In 2011/12 HEFCE distributed around £1.6 billion of QR (mainstream and non-mainstream) to English Higher Education Institutions (HEIs).

Approach and methodology

X1.2 A dual approach was adopted in undertaking the research:

Case study research of a sample of individual HEIs was undertaken. Its aim was to provide an in-depth understanding of the role and importance of non-hypothecated QR funding in supporting and enhancing HEI research, and its qualitative impact on the HEI and its research activity.

Econometric research to assess whether there is a relationship between non-hypothecated quality related research income (total QR) and Third Stream Income (TSI). TSI is a measure of the benefits to external organisations, as reflected in their willingness to pay for contract and collaborative research, consultancy, intellectual property, continuing professional development and other forms of engagement with HEIs. Evidence on TSI was derived from the Higher Education Business Community Interaction Survey (HEBCIS).

X1.3 A sample of 25 case study HEIs was selected from each of five groups of HEIs distinguished by their research intensity, and derived from a statistical cluster analysis of all English HEIs. One group, made up of the six largest and most research-intensive HEIs (Cambridge, Imperial, Kings, Manchester, Oxford and University College London) was selected in its entirety. These are referred to as the Top Six research HEIs. The remaining 19 HEIs were selected from the other four groups (High, Medium and Low research intensity and Arts). The sample of HEIs accounted for 60% of QR funding in 2011.

X1.4 Data collection for the case study research was undertaken using a semi-structured discussion guide which was developed and piloted with a small sample of HEIs. Over 100 face-to-face interviews were carried out with Pro Vice Chancellors (PVCs for Research) or Directors of Resource Allocation, Finance Managers, Heads or Deans of School, Heads of Department, Knowledge Exchange Managers and Principal Investigators (PIs). The broad areas covered in the discussions included the development of the HEIs' research strategy; the place of QR in the strategy; the internal allocation of QR funds; management arrangements and monitoring of QR; the relationship of QR to other research funding streams; what QR is spent on; outputs from QR spending; outcomes (benefits) and the counterfactual.

X1.5 In the case study findings it should be recognised that although QR enters the HEI as a separate source of funding from HEFCE, it is very often combined with other funding streams and, in such cases, it is best viewed as making a *pro rata* contribution in support of the research strategy. In addition, the case studies differ with respect to the terms used to describe different organisational levels. To avoid confusion we refer to three main organisational levels: the Centre, Schools and Departments. The Centre refers to the strategic decision making group at the HEI level, consisting of senior academic and non-academic staff, including the Vice Chancellor or Provost, Pro-Vice Chancellors and Senior Finance Directors; Schools refer to the intermediate organisational tier between the Centre and Departments of the HEI (although different HEIs may refer to them variously as faculties, divisions or colleges). Departments (in some HEIs referred to as faculties) are the third and bottom tier, and are typically located within Schools.

X2 Strategy development

The role of QR in strategy development

X2.1 The role of QR and how it is used to support research depends on how QR funding is allocated, and ultimately on whether the budget is held by the Centre, the Schools or the Departments. This includes any 'top-slicing' of the non-hypothecated funds at each HEI level. In the more centralised approach the broad direction of research and research priorities are set by the Centre.

X2.2 In the more decentralised strategy development process, the overall research priorities of the HEI are the outcome of decisions made by budget holders at the School and Department levels, and it is at these levels that the non-hypothecation of QR funding is important. At the School level decisions on research priorities may be made on a 'collegial' basis, or they may be the result of a 'managerial decision' on the part of the Head (or Dean) of School. This approach is typical of the Top Six HEIs and a few High research HEIs that had large, autonomous Schools and Departments. Increasingly, though, cross-School and cross-Department research is shifting strategic decision making on the role and use of QR more to the Centre.

X2.3 Most of the case study HEIs lie somewhere between the centralised and decentralised decision making process in the development of their research strategies. Typically, the development of research strategy in these institutions involves both horizontal coordination and interaction across Departments or Schools and vertical consultation between the different tiers of the HEI. Subsidiarity in strategic decision making prevails with respect to the use of QR and other research funding streams in many HEIs at what might be deemed the appropriate organisational level, with consultation often taking place across the different levels. For example, decisions on HEI-wide research initiatives being taken at the Centre; decisions on cross-Department and cross-School initiatives at the School level; and decisions with respect to particular research projects being taken at the Department level.

The merits of QR as a funding stream supporting research in HEIs

- X2.4 QR is a non-hypothecated funding stream which supports the bedrock research infrastructure, while grants from Research Councils (RCs), government departments and agencies fund specific research projects and programmes. These two funding streams, together, make up the Dual Support system.
- X2.5 QR as a non-hypothecated funding stream was widely recognised as a critically important element of the Dual Support system, and commanded broad support from case study respondents across the full range of academic disciplines. Specifically:
- QR is valued as a stable source of funding that enables long term strategic development of research and the development of critical mass research capability. In particular, the greater predictability and certainty of QR funding is important for making new high level appointments and, more generally, sustaining research competitiveness.
 - Non-hypothecation is an important attribute of QR funding in facilitating flexibility in the development and implementation of a research strategy. It provides the opportunity to allocate resources to priority research areas, new and emerging areas of research, underperforming areas, and more generally to those areas of research which may not easily secure financial support from RCs.
 - Flexibility afforded by non-hypothecation enables discretionary spending by HEIs across a variety of initiatives but this flexibility is constrained by the need for QR funding to contribute towards predetermined expenditures such as salaries of core tenured staff. This is a particularly important issue in HEIs in receipt of relatively large QR funds which are deeply embedded in the HEI's financial system and make a substantial contribution to the overall income of the HEI.
 - QR enables HEIs to restructure their research resources; for example, when academic posts are suppressed in one area of research (or discipline) and transferred to areas with greater priority; or when major new appointments are made
 - QR is widely used to attract and lever research funding into the HEI including matched funding in bids for RC, charity or EU funding.

Strategic aims and objectives in the use of QR

- X2.6 Although all the case study HEIs had developed institutional strategies, they varied according to the extent to which those strategies were primarily concerned with establishing the broad research aims and objectives and the institutional framework and guidelines within which research takes place across the institution. They also differed according to whether they provided a detailed strategic plan identifying research and expenditure priorities and the contribution to the strategy to be made by the different Schools, Departments and Research Centres.
- X2.7 For many HEIs the overriding aims which give direction and purpose to their research strategy derived explicitly from major socio-economic challenges, where the HEI believes its research can potentially make a positive impact. Whilst recognising this, there was widespread agreement that the primary aims and objectives of QR funding (in combination with other research funding streams) were to enhance and sustain high quality research output, and to strengthen the research-teaching nexus. For the

Top Six HEIs the achievement of excellence across all disciplines was seen as important, whereas most of the other HEIs emphasised the importance of QR in maintaining excellence in specific research areas.

X2.8 The role of QR in securing intermediate objectives which facilitate and enable the achievement of research excellence and research translation was also widely reported by the case study respondents. Particular emphasis was given to:

- Facilitation of interdisciplinary research through Research Centres and other initiatives
- The development of collaborative and partnership initiatives
- The retention and recruitment of outstanding research leaders
- Securing the required scale and composition of capability across disciplines
- Improvements to the research infrastructure (equipment and buildings)
- Training and development of post-graduates and early career researchers
- Strengthening of professional research management support

X2.9 The relative importance of these intermediate objectives differed across HEIs. The Top Six HEIs all put substantial priority on encouragement and support for interdisciplinary research, and the need to maintain and enhance the quality of their research by attracting and retaining world class researchers. The High research and Medium research HEIs, particularly those at an early stage of building their research capability, also acknowledged the importance of interdisciplinary research, but emphasised the significance of collaborative research with other institutions too.

X3 Resource planning and the allocation of QR funds

Background

X3.1 The allocation of resources inevitably plays a critical role in the support of the overall research strategies of HEIs. As the strategic aims and priorities of an HEI develop and change through time, they are matched by appropriate shifts in the allocation of financial and physical resources.

X3.2 Government policy allocates mainstream QR funding to HEIs through a formula which rewards past research performance, as reflected in the volume and quality of research outputs indicated by the 2008 Research Assessment Exercise (RAE) and, in future, the 2014 Research Excellence Framework (REF). In this way government policy concentrates research funding in institutions where there is evidence of research of high quality. In addition non-mainstream QR funding was introduced in 2005 in respect of income that is derived from charitable foundations, business income and income from post-graduate research students.

X3.3 The allocation of QR within HEIs is undertaken by the Centre, often with the help of a formal resource allocation model (RAM). The RAM allocates resources and assigns costs to organisational units in the HEI. Resource allocation takes place not only at

senior management level operating from the Centre, but also at School and Department levels, where more informal bargaining approaches are much more prevalent as the means by which resources are allocated to spending units. QR, like other sources of non-hypothecated funds, is also potentially subject to 'top slicing' at the Centre, School and Department levels to support the building of specific funds to support discretionary spending.

Allocation approaches

- X3.4 The case studies suggest that QR is rarely used as a free-standing research income stream in support of the research strategy. The most common practice in most of the case study HEIs is for QR to be combined with other funding streams for allocation purposes, and most of the HEIs in the study did not separate QR from all other income although there is typically transparency with respect to different sources of income.
- X3.5 Four different approaches to the allocation of QR funding (in the first instance) were identified. In Model 1, used by 15 of the 25 HEIs, the Centre allocates QR to Schools in the first instance; in Model 2, used by five of the HEIs, the Centre by-passes Schools, and allocates QR directly to Departments; in Model 3, used by two HEIs in which there were no Schools, the Centre also allocates QR directly to the Departments; in Model 4, HEIs are distinguished in that they have only one unit of assessment (UoA) submitted for purposes of the RAE (REF). The allocation of QR funding here is, in one case, from the Centre to Principal Investigators (PIs) and in the other from the Centre to the Schools.

Allocation approach by the Centre

- X3.6 In a majority of the case study HEIs (15 out of 24) the Centre tended to mimic the HEFCE formula in allocating QR in the first instance or adopted a formula that was heavily influenced by it. All Top Six HEIs made some use of the HEFCE formula approach. Five HEIs used a non-HEFCE formula; three did not use a formula. 'Top slicing' was carried out by 13 HEIs.
- X3.7 The rationale or merits of using a HEFCE or HEFCE-based formula for allocating QR were variously reported as:
- Fairness – acknowledging and rewarding the contribution to overall HEI research of the performance of the Schools and their Departments where QR was 'earned'
 - Incentivising and driving high research Schools/Departments to sustain and enhance the output of high quality research
 - Simplicity and transparency – ensuring that Schools know where their income comes from, the contribution of QR to surpluses (or deficits), and the financial implications for subsequent RAE/REF submissions
 - Ensuring the viability of Departments where individuals have a degree of autonomy to do creative and transformative research, make the connections that they want to make, and contribute to the HEIs' capability to do world leading research.

- X3.8 Whilst there was widespread support for allocating QR funds according to the HEFCE formula, there were some concerns that cascading the bulk of funds down to where it was earned limited the opportunity to do something really strategic, particularly in areas of interdisciplinary research.
- X3.9 Where the Centre did not follow a formulaic approach, the allocation of QR was more centralised and was aimed towards addressing specific strategic issues or areas of research or on a 'needs' basis to ensure strategic oversight.
- X3.10 At a specialist Arts HEI, the criteria for the allocation of QR funding focused on the potential to generate high quality output, whereby individual academics needed to demonstrate above average research activity or, in the case of early career researchers, a research potential.
- X3.11 In one other non-formulaic allocation approach, the HEI decides how much QR income is needed for strategic purposes, and then generally allows bids from Schools into a process which it is hoped will secure major changes within the broad strategic stance. The approach is seen to be more inclusive, in that it encourages both top-down and bottom-up involvement in the development and implementation of the research strategy. The HEI believes this has stimulated greater responsiveness to opportunities, and a reduced cost of funding major change.

Allocation by Schools and Departments

- X3.12 The approaches used for the allocation of QR funds at lower tiers are, on the whole, more complex compared with the Centre level and not mandated by the Centre.
- X3.13 Where the Centre in the first instance allocated QR funds to Schools, total QR may be allocated in its entirety, or it may be subject to an element of 'top-slicing' for funds to be used by the School. Allocation by the School to Departments may follow the HEFCE formula or an adaptation of it. Alternatively, Schools may adopt a 'managerial' approach to allocation in which a variety of allocation criteria may be used, and decisions reached 'collegially' or through a bidding process, involving consultation (sometimes quite limited) with Department Heads and others. QR may or may not be separately identified from other funding streams in the income allocated to Departments.
- X3.14 At the Departmental level, QR funds are allocated to individual researchers or research teams, and deployed to purchase equipment and other support for research activity. The allocation process often involves a bidding approach in which research proposals and other proposals for using QR are put forward by academic staff, and are normally considered by a research committee. Departments may or may not engage in some 'top slicing'.

Attribution of costs

- X3.15 Most of the resource allocation models and approaches incorporate a cost recovery process, by which services (indirect costs) provided by the HEI to its constituent Schools, Departments and other institutions are covered. From their total income, the Schools are expected to meet all staff costs (i.e. the people who do teaching and research activities), non-pay costs (e.g. laboratories, consumables etc), and a share of the HEIs' costs of providing central services, i.e. indirect costs which include all of the estates costs, premises costs, cost of running finance, HR, the libraries, and other professional support services. Although cost recovery practices differ among HEIs, they generally fall into two main categories, of either a taxation model or 'corporate charging'; in practice these serve the same purpose, namely to support the provision of general HEI functions. Some HEIs also set financial targets for their Schools to encourage the management of both costs and income.
- X3.16 Most of the sample HEIs employ a 'cost of activities approach', which recognises the fact that different academic units have different degrees of research intensity, or a different balance of undergraduate and post-graduate teaching.

X4 Management, monitoring and evaluation

- X4.1 All the case study HEIs recognise the importance of strategic management in securing effective and efficient use of QR funding. This management is distributed across the Centre, Schools and Departments and combines both formal and informal practices. In almost all HEIs, QR is managed as part of the overall income flow. Each HEI has a PVC for Research or equivalent taking responsibility for overall management of research.
- X4.2 Professional financial and research management was widely used to support the PVC for Research and also for Heads of School/Department in the larger research-intensive HEIs.
- X4.3 Faced with the challenge of how best to encourage the efficient and effective use of QR (and other research resources) HEIs are deploying a variety of approaches including financial target setting, de-centralising spending decisions to Schools or Departments and the development of better metrics for monitoring, evaluation and performance management of research more generally.
- X4.4 To the extent that the Centre (senior HEI management) controls overall budgets for the HEI, the management of QR is centralised and decisions are made by an executive research committee which has responsibility for determining broad research priorities and the disbursement of research funding. This committee typically reports to the HEI Finance Committee which would include the Director of Finance or Director of Resource Allocation. Variants of this centralised approach were also identified in the sample of case studies.

- X4.5 Where budgets (including QR) are devolved to Schools, each School is responsible for setting research priorities and allocating resources to the different Departments within their School. This may involve a formal School research management committee made up of the Heads of Department and other senior members of the School such as the Finance Manager and where decisions are reached consensually. Alternatively the Executive Dean of the School may operate a less formal approach involving more limited interaction with Heads of Department and the Centre.
- X4.6 At the Department level decisions are again made consensually through a formal research committee made up of Principal Investigators (PIs) or less formally by the Head of Department following discussions with PIs. Collegiality is widely reported as an effective management approach.
- X4.7 Monitoring of research outputs was undertaken by all HEIs for purposes of RAE/REF but specific monitoring of QR funded research outputs was limited to the monitoring of specific initiatives funded by QR. Few HEIs evaluated QR spending other than in terms of outputs and impacts relating to specific expenditures.
- X4.8 All HEIs had established a facility responsible for commercialisation and wider knowledge exchange activity in relation to external organisations and the community.

X5 The relationship of QR to other funding streams

- X5.1 HEIs are increasingly seeking funding from alternative sources for two main reasons. The first is the introduction of substantial non-mainstream QR funding, which is linked to the attraction of funding from charities and business, and for PhD programmes. The second is the adoption of a Full Economic Cost (FEC) framework which followed the review of the Dual Support system in the Science and Innovation Framework Report 2004-2014.
- X5.2 QR plays an important role in these developments, first by mitigating the uncertainty associated with non-mainstream QR and leveraging external funding into institutions. Secondly, QR is increasingly used by HEIs to cover the FEC of research, with many reporting that without QR there would be a major funding shortfall particularly with respect to Research Council and charity funded research.

QR funding and research councils

- X5.3 QR provides HEIs with the capacity and the flexibility to support the acquisition of additional research funds from Research Councils. The same is true in the establishment of doctoral (and post-doctoral) training centres, where QR funds are used to provide matching grants for [research] posts that are linked to Research Council grant projects, and to fully support post-graduate studentships.
- X5.4 At the lower tiers of HEIs, QR funding is particularly important for investing in the base research capability through the appointment of research leaders who then successfully bid for and attract Research Council funding.

QR funding and charities

- X5.5 Charitable funding is a growing proportion of total HEI research funding and is available across the spectrum of academic subjects, although it is of much greater significance in the sciences, particularly the medical sciences. Many HEIs pointed out that without charity support QR Funding, it would be difficult to conduct research in bio-medicine and other emerging areas of research. That view was especially strong among the research-led HEIs, as well as those HEIs with specialism in medical or scientific areas that are particularly dependent on charities for research funding.
- X5.6 In the case of multi-million pound research awards, there is an explicit demand from the charities for a contribution from HEIs, for which non-hypothecated funds such as QR are crucial.
- X5.7 QR funding plays an important role in keeping strategic charitable income in the UK, in that charitable organisations are free to spend their resources outside the UK if HEIs are unable to contribute to the initiatives they support.

QR funding and business and industry

- X5.8 QR funding is used to leverage funds from the industry but this was not as extensive or direct, compared with Research Councils and charities.
- X5.9 QR funding, combined with funding from industry, is frequently used to fund the establishment of specialised technology Research Centres often in an emerging area of research. In a number of cases the Research Centre will also be supported by additional funds attracted from a Research Council.

QR funding and other funding streams

- X5.10 QR is used to leverage internal institutional funds which might be used for a variety of purposes including pump priming, purchase of scientific equipment or the establishment of a strategic research fund.
- X5.11 QR funds are used to secure research grants from the EU indirectly through their role in building the HEIs core research infrastructure and directly by providing matching funds for EU grants.

X6 What is QR spent on?

- X6.1 QR funding supports a wide and diverse range of research activities and initiatives which may be grouped under three broad areas of expenditure:
- Support for the core research infrastructure including research staff, equipment and estate
 - Spending to secure restructuring of research
 - The accumulation of funds to support strategic initiatives

Supporting core research infrastructure

- X6.2 QR plays a vital role in supporting the core research infrastructure in all the institutions in this study. This is not least because a large proportion of QR is used to support staff salaries, in one way or another. This is particularly important for the research-led Top Six and the large High research HEIs. Inevitably, much of this expenditure is on academic staff salaries, particularly the appointment of high quality staff.
- X6.3 QR is widely used (particularly by the Top Six HEIs and other research led institutions) to recruit and retain research leaders to facilitate and drive the opening of new research areas. This often includes the provision of improved or new state of the art physical space and amenities which forms part of an 'appointment package'. In this respect QR provides a degree of funding security for research leaders as opposed to the uncertainty attached to funds from competitive bidding.
- X6.4 QR funding supports the appointment of early career and post-doctoral researchers and the training of research students.

Supporting restructuring of research

- X6.5 The non-hypothecation of QR enables many HEIs to act strategically and develop not only new areas of research, but also to develop areas that are underperforming. In this way, HEIs have used QR funding to support fundamental structural change that is often at the heart of their research strategy.
- X6.6 QR is used across a wide range of HEIs to facilitate restructuring by providing support for the development of inter-disciplinary research and novel kinds of collaborative research.
- X6.7 Among the most visible aspect of the restructuring of research is the establishment of new Research Centres and the pursuit of high risk, curiosity-driven, and often fundamental research.

Supporting building of strategic funds

- X6.8 Top-slicing to accumulate strategic or contingency funds takes place in many of the case study HEIs and is undertaken at the Centre, School and Department levels. These top-sliced funds are used to support a wide variety of initiatives including for example the setting up of Research Centres, start-up packages for new professors, major new infrastructure projects, pump-priming and reserves in support of leverage activities.
- X6.9 In conclusion, the picture that emerges clearly is the diversity and novelty of initiatives on which QR funding is spent, reflecting the diverse circumstances of the different HEIs and the strength of the non-hypothecated nature of QR.

X7 Outputs, benefits and impacts from QR funding

Outputs

- X7.1 Outputs associated with QR funding include the quantity and quality of new knowledge (knowledge creation), research capacity and capability, quality of teaching and training and the diffusion of knowledge to the economy and society.
- X7.2 It is often difficult to specifically attribute these outputs to QR funding because the latter is widely used in combination with other research funding sources. In these cases a pro-rata attribution is one approach and on this basis a significant proportion of the research outputs achieved in English HEIs can be attributed to QR. Moreover the case studies establish a strong presumption that in the absence of QR some research activities and initiatives would not have occurred at all.
- X7.3 For this study outputs are defined as enhanced or improved research capability and improved knowledge from the quality of research undertaken in HEIs. New knowledge may be derived from activities funded in part or in total from QR. Knowledge creation is at the heart of all fundamental work (so-called ‘blue skies’ research). As it has become more difficult for researchers to get Research Council grants and funding from other external funders, the availability of QR has enabled researchers to continue to work and develop ideas and methods, and to publish their research findings to show that some of the ideas actually work.
- X7.4 There is extensive evidence from all HEIs indicating that QR funding has contributed directly and indirectly to the generation of different types of research output. Central to it all is the fact that QR funding has provided institutions the flexibility to make strategic decisions; for example, in their recruitment of ‘star’ research staff, but also in retaining key staff, improving the research physical infrastructure, building and maintaining a critical mass of research, ensuring diversity of research and strengthening the research-teaching nexus.
- X7.5 Outputs give rise to benefits and impacts. The focus here is on benefits for HEIs and their staff, graduates and undergraduates. Benefits to HEIs take a number of forms – most importantly the enhanced reputation of the HEI associated with increased quantity and quality of research, improved research capability, and increased competitiveness in bidding for research funds.
- X7.6 Individual researchers benefit directly from QR insofar as it leads to a strengthening of their research profile, reputation and career opportunities. Benefits for post-graduates include high quality research training and improved employability.

X8 The counterfactual

- X8.1 All but two HEIs reported that a reduction of QR without replacement by some alternative source of government funding would result in reduced research, academic redundancies, diminished research infrastructure and unfilled vacant posts. A

reduction in Strategic Research Funds supported by QR was also identified as undermining the capacity of an HEI to run cross-School HEI level facilities and to attract funding for major strategic initiatives.

- X8.2 All the large research-intensive HEIs, where QR is a major source of funding and deeply embedded within their overall financial structure, emphasised the potential damage and erosion of the core research infrastructure depending on the scale and timing of the QR reduction. Less research-intensive HEIs receiving much smaller amounts of QR, believed that they might no longer be able to count themselves as research active and revert solely to teaching.
- X8.3 Several HEIs indicated that the more expensive research activities such as interdisciplinary research might be curtailed and that delays in replacing equipment would lower research productivity. Medical and Life Science Schools, among others, suggested that investing in new and uncertain areas of research and the ability to support fledgling researchers would diminish.
- X8.4 A reduction in QR would reduce HEIs' capacity to bid for Research Council, charitable and other competitive sources of research funding, potentially beginning a spiral of descent. Reduced Strategic Research Funds supported by top slicing of QR was also identified as undermining research income by reducing the capacity of HEIs to provide matched funding.
- X8.5 Greater reliance on commercial sources of funds was seen to threaten academic autonomy and curtail fundamental research by a number of HEIs. More effort and time seeking external funding was also seen to be at the cost of engagement with students, with more teaching likely to be done by post-graduates.
- X8.6 It was widely reported that any reduction in QR would impact disproportionately on certain Schools, such as those in Arts and Humanities and Social Sciences. This is consistent with the much greater dependence on this aspect of the Dual Support system by these disciplinary groups.
- X8.7 Concern was also expressed that funds might be switched to Research Councils, narrowing the spectrum of research being supported and intensifying competition for research funding. Uncertainty in securing and sustaining Research Council funding would, it was argued, make it more difficult to recruit outstanding star researchers and research leaders.
- X8.8 Increased student numbers, including overseas students, was widely reported as a potential strategic response to make up for lower QR funding but the High research HEIs believed that if QR reductions were substantial income from this source would not fully compensate and competition for students would be fierce. A number of HEIs remarked that research is not an add-on.
- X8.9 Taken as a whole the counterfactual analysis reveals a strong complementarity between non-hypothecated income and other HEI research funding streams and activities. In particular, the links between Research Council related activities and non-

hypothecated income emphasise the strengths of the Dual Support system and the need to see the two elements of the system as complements and not as substitutes

X9 Econometric estimates of impacts

Trends in QR funding

- X9.1 The relative position of mainstream QR and Research Council funding has shifted over time, with Research Council funding by the end of the research period higher than QR, whereas it was lower at the beginning of the period.
- X9.2 The growth of non-mainstream QR has offset the relative weakening of QR compared to Research Council funding, so that over the period as a whole, the sum of mainstream QR and other QR (total QR) has risen substantially in real terms.
- X9.3 Science, Technology Engineering and Mathematics (STEM) subjects are disproportionately funded by the Research Council route; Health is dominated by charitable sources of funding; Social Sciences and, in particular, the Arts and Humanities are more dependent on mainstream QR than are the other subject areas.
- X9.4 There is a substantial concentration of Third Stream external income generated by English HEIs. In 2003, concentration was highest in the intellectual property stream, where the top 10% of universities accounted for nearly 84% of all the intellectual property income earned. This was followed in that year by income from leasing facilities and equipment, where the top 10% accounted for 72% of the income earned. In general for each source of income in the period 2003-2011, there was a tendency for the share of the top 10 universities to decrease in the period 2003-2011.

Econometric analysis

- X9.5 The quantitative impacts from QR funding may be best assessed from the relationship between the non-hypothecated research income (total QR) and the Third Stream income (TSI) from external organisations. TSI is a proxy for economic impact and measures the willingness of external organisations to pay for a range of research related activities and commercialisation (e.g. contract and collaborative research, licensing, consultancy). An important purpose of this analysis was to assess whether there is a relationship between total QR and TSI which can be identified separately from Research Council (RC) funding and the Higher Education Innovation Fund (HEIF).
- X9.6 In undertaking the econometric research it was important to recognise the difficult problem raised by multicollinearity between total QR and RC. The qualitative analysis based on detailed case studies shows the non-hypothecated total QR component of the Dual Support system and the Research Council component have strong complementary characteristics. Total QR income is used to support strategic initiatives designed to enhance an HEI's ability to raise its overall research capacity and to compete effectively for Research Council funding. Equally, Research Council

funding itself produces the kinds of academic output which features strongly in RAE/REF exercises and hence it influences total QR funding. Attempting to isolate the effect of one from the other is therefore problematic.

- X9.7 There is a positive relationship between non-hypothecated income measured by total QR per Head (mainstream QR plus non-mainstream) and the generation of TSI per Head in a subsequent period. This result is both statistically and economically significant. The relationship is a non-linear one with the biggest effects occurring at the higher levels of total QR income per Head. There is a similar positive and statistically significant relationship with Research Council income.
- X9.8 The regression models imply that a 1% increase in total QR per full time equivalent (FTE) staff member evaluated at the upper quartile value of TSI would lead to a 0.2% increase in TSI, whilst a 5% increase at the upper quartile would lead to a 0.99% increase in TSI; and a 10% increase would lead to a 1.95% increase in TSI. At the lower quartile value of TSI per FTE, the corresponding responsiveness of third stream income to percentage changes in total QR per FTE was 0.06%, 0.32% and 0.63%.
- X9.9 A similar relationship exists between Research Council (RC) funding and TSI as well as between the combined value of TQR plus RC and TSI. The multicollinearity between RC and total QR makes it difficult to separate out the effects of total QR and RC. Moreover, the case study evidence and the qualitative counterfactual analysis suggest it is best to see them as having a combined complementary impact. They should not be regarded as substitutes.
- X9.10 With respect to the impact of the Higher Education Innovation Fund (HEIF), an overall positive effect is identified in enhancing the role that lagged total QR per Head and RC per Head plays in generating TSI.

1 Introduction

1.1 Aims and objectives of the study

1.1.1 In 2013 the Higher Education Funding Council for England (HEFCE) and Universities UK commissioned PACEC Ltd and the Centre for Business Research (CBR), at the University of Cambridge, to review the quantitative and qualitative impacts of non-hypothecated research funding (quality related research funding or QR funding) and the institutional practices and procedures for its deployment and use. In academic year 2011-2012 HEFCE distributed around £1.6 billion of QR funding (mainstream and non-mainstream) to English higher education institutions (HEIs).

Objectives of the case study research

1.1.2 The case study research was designed, firstly, to provide qualitative evidence and an in-depth understanding of the role of QR funding (mainstream and non-mainstream) in supporting research in a sample of 25 case study HEIs and, secondly, (although not covered in this report), to 'showcase' a number of research initiatives in which QR has made an important contribution to sustaining the UK research base in meeting the major challenges facing society. At the same time the case study research also sought to complement the statistical and econometric analysis undertaken as part of the study. In this respect it aims to enhance our understanding of the findings of the econometric analysis

1.1.3 More specifically the case study research aimed to provide evidence at the level of the institution to show:

- The distinctive value of HEFCE non-hypothecated research (QR) funding that contributes to the strength of the UK research base.
- That HEFCE research funding is managed effectively by the sector to secure the maximum outcome. The objective is to provide an analysis of the procedures and practices that HEIs have in place for managing QR funding, and on how well these procedures allow the grant to be managed effectively. It includes:
 - How funding is distributed within institutions, and how research quality and effectiveness are taken into account in this process
 - The processes for monitoring and evaluating research spending in institutions
 - Drawing out any observable trends in the management of research funding across different types of institutions and across the full spectrum of research disciplines, highlighting observable differences across institutions
- The range of benefits arising from this research funding, including direct and indirect outcomes, which can be shown both quantitatively and qualitatively. The analysis for this stage was extended to explore:
 - What non-hypothecated research (QR) funding is spent on
 - The particular contribution of QR in complementing other funding streams and leveraging other funding streams
 - Specific examples of research success as well as an evaluation of the general benefits of HEFCE funding

Objectives of the econometric research

- 1.1.4 The main aim of the econometric research was to assess whether there is a relationship between non-hypothecated research (QR) funding and Third Stream income (TSI). TSI is a measure of the benefits to external organisations, as reflected in their willingness to pay for contract and collaborative research, consultancy, intellectual property, continuing professional development and other forms of engagement with HEIs. Evidence on TSI was derived from the Higher Education Business Community Interaction Survey (HEBCIS).
- 1.1.5 The econometric research also sought to establish whether the impact on TSI of QR funding could be distinguished from the impact of Research Council (RC) funding and whether funding through the Higher Education Innovation Fund (HEIF) was significant and moderated the relationship between QR and RC funding.

1.2 Research design

- 1.2.1 This section summarises the design of the case study research. The econometric research programme is presented in Chapter 9 of this report.
- 1.2.2 The case study research programme included the following research tasks:
- 1 Design of a conceptual framework for positioning the role of QR funding in the research strategy of an HEI
 - 2 Selection of case study HEIs
 - 3 Design of case study discussion document
 - 4 Collection of qualitative data
 - 5 Database assembly and analysis

The conceptual framework

- 1.2.3 A simple conceptual framework (see Figure 2.1 Chapter 2) was designed, within which the role of QR funding and its relationship to other elements influencing and shaping the development of research strategy in the HEI could be understood and analysed. In particular, the framework positioned QR and the key research questions in the context of the development of research strategy. The framework also guided the design of the empirical research programme, in terms of the design of the discussion and case study data collection.

Selection of case study HEIs

- 1.2.4 The methodology for selecting the 25 case study HEIs was based on an initial statistical cluster analysis. This analysis distinguished five groups of similar HEIs

based on research intensity; this then provided the basis for the stratified random selection of case study HEIs within each of the cluster groups.²

- 1.2.5 One group of HEIs was excluded from the cluster analysis, although they were, nevertheless, used in the selection of the case studies. This group consisted of the main high research-intensity HEIs, of which there are six. This group was identified, based on several criteria, including research spending, number of academic research staff, Research Assessment Exercise (RAE) score and ranking in terms of research intensity.
- 1.2.6 The Top Six HEIs selected on the above criteria are:
- University of Cambridge
 - Imperial College, London
 - King's College London
 - University College London
 - University of Manchester
 - University of Oxford.
- 1.2.7 The remaining HEIs were then partitioned into 'High', 'Medium' and 'Low' research intensity groups and the 'Arts', based on the cluster analysis. HEIs that received no QR funding in 2010-2011 were excluded from the sampling frame. The HEI clusters are shown in full in Appendix A. The final case study sample was then selected on the following criteria:
- Each of the Top Six HEIs is included in the sample
 - The sample in each cluster must be at least 1 (which set the sample for high intensity ≥ 1 , medium intensity ≥ 1 and low intensity ≥ 1)
 - The sample in each region must be at least 1
- 1.2.8 The samples for the remaining four clusters were then allocated pro-rata to the share of QR funding in each research cluster.
- 1.2.9 Table 1.1 shows the sample distribution of HEIs in the five cluster groups, and also by location in the regions. There is representation across all nine regions and in all the five research intensity cluster groups.

² For this study, we drew on the cluster analysis used in the PACEC/CBR report (for HEFCE) on *Evaluation of the effectiveness and role of HEFCE/OSI third stream funding*. See HEFCE Report April 2009/15.

Table 1.1 Sample case study HEIs, by research cluster and research and English region (number)

| Region | Top Six | High | Medium | Low | Arts | Total |
|---------------------------|----------|-----------|----------|----------|----------|-----------|
| East Midlands (EM) | | | | 1 | | 1 |
| Eastern Region (ER) | 1 | 2 | 1 | | | 4 |
| Greater London (GL) | 3 | 3 | | | 1 | 7 |
| North East (NE) | | 1 | 1 | | | 2 |
| North West (NW) | 1 | | | | 1 | 2 |
| South East (SE) | 1 | 2 | | | | 3 |
| South West (SW) | | 1 | 1 | | | 2 |
| West Midlands (WM) | | 1 | | | | 1 |
| Yorkshire and Humber (YH) | | 2 | 1 | | | 3 |
| Total | 6 | 12 | 4 | 1 | 2 | 25 |

1.2.10 Table 1.2 shows the sample distribution of QR funding in the five cluster groups. The data show that the allocation of QR is correlated to research intensity; and the two most research-intensive groups account for more than 90% of the total allocation of QR funding for this sample as a whole.

Table 1.2 Sample, by research cluster and region (QR funding £m)

| Region | Top Six | High | Medium | Low | Arts | Total |
|--------------|--------------|--------------|-------------|------------|------------|--------------|
| EM | | | | 4.2 | | 4.2 |
| ER | 109.0 | 18.6 | 4.5 | | | 132.2 |
| GL | 246.2 | 40.2 | | | 6.4 | 292.8 |
| NE | | 34.1 | 2.5 | | | 36.5 |
| NW | 78.8 | | | | 0.2 | 79.0 |
| SE | 117.8 | 58.4 | | | | 176.2 |
| SW | | 48.2 | 5.5 | | | 53.7 |
| WM | | 42.1 | | | | 42.1 |
| YH | | 71.6 | 2.3 | | | 73.9 |
| Total | 551.9 | 313.2 | 14.8 | 4.2 | 6.6 | 890.7 |

The HEIs in each cluster in the sample are listed in Table 1.3. The amount of QR allocation for this sample is £890,683,519. This is approximately 59% of the total QR funding (£1,505,537,625) allocated to English HEIs in 2010-2011.

Table 1.3 Case Study HEIs and QR funding 2010-2011

| HEI Name | QR (£M) 2010-2011 |
|--|----------------------|
| Top Six research (all 6) | |
| University of Cambridge | 109.0 |
| Imperial College London | 85.9 |
| King's College London | 55.3 |
| University College London | 104.9 |
| University of Manchester | 78.8 |
| University of Oxford | 117.8 |
| High research (12) | |
| Cranfield University | 9.2 |
| University of Essex | 9.4 |
| Institute of Education | 8.0 |
| London School of Economics and Political Science | 15.9 |
| London School of Hygiene & Tropical Medicine | 16.2 |
| University of Newcastle upon Tyne | 34.1 |
| University of Southampton | 42.7 |
| University of Sussex | 15.7 |
| University of Bristol | 48.2 |
| University of Birmingham | 42.1 |
| University of Leeds | 46.5 |
| University of York | 25.1 |
| Medium research (4) | |
| University of Hertfordshire | 4.5 |
| University of Sunderland | 2.5 |
| University of the West of England, Bristol | 5.5 |
| University of Huddersfield | 2.3 |
| Low research (1) | |
| Nottingham Trent University | 4.2 |
| Arts (2) | |
| University of the Arts London | 6.4 |
| Royal Northern College of Music | 0.2 |
| Total (25) | 890.7 |

- 1.2.11 For each of the 25 HEIs in the sample, two Schools and two Departments were selected for interview across four major disciplines – STEM, Health Sciences, Arts & Humanities, and Social Sciences.

Design of questionnaire and data collection

- 1.2.12 Data collection was undertaken using a semi-structured discussion guide, which was developed and piloted with a small sample of Pro-Vice Chancellors (PVCs) and Heads of School and Principal Investigators. The structure of this discussion guide was the same for each type of respondent and nuanced to reflect differences in their position and role in the development of the HEI research strategy and the deployment and use of QR funding. The following broad areas were included in the discussion guide:
- a Background – HEI/School/Department Research Strategy
 - b The Place of QR in the Research Strategy
 - c The Allocation of QR Funding (Mainstream and Non-mainstream)
 - d Management Arrangements and Monitoring of QR Funding
 - e The Relationship of QR Funding to other Research Income Streams
 - f What QR Funding Is Spent On or Directly Helps With
 - g Outputs, Outcomes and Impacts of QR Funding
 - h Assessment of the Counterfactual
- 1.2.13 The main data collection process itself involved face-to-face interviews with a wide range of contacts in each of the case study sample HEIs, including PVCs for research, Heads of Schools and Departments, Principal Investigators, Finance Directors and Knowledge Exchange Managers. All of the interviews were recorded and transcribed. The transcribed interviews were then coded and analysed thematically using Atlas.ti, a computer assisted qualitative data analysis software (CAQDAS).

1.3 Report structure

- 1.3.1 Following this introduction, Chapter 2 sets out the conceptual framework and positions the role of QR funding in that framework. Chapter 3 analyses the different approaches by which QR funding is allocated to the different tiers or organisational levels of the HEI (the Centre, the Schools and Departments). Chapter 4 is concerned with how QR funding is managed, including the structures in place for monitoring and evaluating the use of QR funding. Chapter 5 focuses on the relationship of QR funding to other funding streams, in particular the role of QR funding in attracting other sources of funding. Chapter 6 analyses what QR funding is spent on. The different outputs and outcomes that are generated and their impacts are the subject of Chapter 7, while the penultimate chapter (Chapter 8) addresses the question of what the counterfactual might look like. The final chapter (Chapter 9) assesses the impacts of QR funding, through econometric analysis, by looking at the relationship between this non-hypothecated research income and Third Stream income.

2 Research Strategy Development and the Role of QR

Panel 2.1 Key findings

- *The primary aims of QR funding, in combination with other research funding streams is to enhance and sustain high quality research output and strengthen the research-teaching nexus. Achieving excellence across all disciplines is important for the Top Six HEIs. Other HEIs emphasised the role of QR funding in securing excellence across specific research areas*
- *The role of QR funding and decisions on how it is used to support the broad direction of research and specific research priorities, depend on where decisions are made. HEIs adopt either a centralised (where decisions are made by a senior management team at the Centre) or a decentralised approach where decisions are taken by Schools and Departments with some central high level strategic input*
- *The decentralised approach is characteristic of the Top Six HEIs, the centralised approach of certain middle ranking High and Medium research-intensive HEIs but for many HEIs strategy development is a distributed process involving the Centre, Schools and Departments*
- *As a funding stream supporting the strategic development of research, the merits of QR funding are perceived to be its:*
 - *non-hypothecation giving greater autonomy to invest in selected areas of research, cross-subsidising new developments, restructuring Departments and promoting novel kinds of interdisciplinary and collaborative research*
 - *stability enabling long-term strategic development of research and the development of a critical mass of research capability*
 - *reliability and certainty compared with other competitive sources of research funding*
 - *flexibility facilitating the restructuring of research activity and enabling discretionary spending on a wide range of activities supporting the quantity and quality of research*
 - *leveraging potential in securing grants and funds from non-governmental sources*

2.1 Introduction

2.1.1 The need for HEIs to articulate a strategy at the institutional level is of increasing importance. This is driven by a persistent pressure on research funding, the requirement to demonstrate impact and value for money, intensifying global competition for funding and a redefinition of the role of HEIs in the economy and society. Existing case study research reveals that HEIs differ in several important respects in their response to these pressures, both in the extent to which they engage in strategic planning of their research activity and the processes by which their strategic objectives and priorities are established; see Jarzabkowski (2002), Taylor (2006). In this context, this chapter reviews the role of QR in the process by which the research strategy of an HEI is developed and agreed. In supporting and maintaining the core research infrastructure, QR plays an important role in the research strategy. The research performance of an HEI is important for its reputation, particularly so for a research-intensive HEI and as such is a key source of competitive advantage in

attracting high quality academic staff, top quality students, research funding and income from business and charitable organisations. Increasing regard for global rankings of research performance is also obliging HEIs to consider how they might use QR to reshape their strategies and reconfigure their organisational structures to improve research (and teaching) quality and secure a rise in the rankings; see Hazelkorn (2009).

- 2.1.2 As a non-hypothecated funding stream, QR is one of several different sources of research funding influencing the development of an HEI's research strategy. Complemented by funding from RCs committed to securing specific project and programme based research objectives, it is a key component of the government's Dual Support system for HEI research. Additional research funding comes from business, charitable foundations and a range of government departments, agencies and institutions. These different funding streams influence the overall aims and direction of the research strategy through their impact on the research priorities and the overall portfolio of HEI research. For example, RC funding in large part focuses on supporting research themes perceived important by government. Corporate sector contract and collaborative research funding will tend to support corporate objectives and may shift the balance of HEI research away from long term basic and more uncertain research towards short term applied incremental research in support of specific corporate objectives.
- 2.1.3 The role of QR in the determination of an HEI's research strategy also depends on how QR funding is allocated within the HEI and the degree of autonomy of the different parties and organisational units (Centre, School, and Department, see Section 3.4.1) engaged in strategy development. One important distinguishing feature across HEIs is the degree of centralisation in the determination of the aims and objectives of their research strategy and the process by which these aims are agreed and prioritised. Differences across HEIs in the allocation of QR funding between the Centre, Schools and Departments is important in that it gives rise to differences in the locus of strategic decision making and the process by which the overall research strategy is ultimately developed. There is anecdotal evidence that the legacy of past performance in accessing different research funding streams, including QR, is also critically important in the funding and development of the research strategy.
- 2.1.4 The next section of this chapter presents a simple conceptual framework for analysing the key elements that typically contribute to HEI research strategy and positions QR in the context of this framework. Secondly it presents case study evidence relating to the determination of research strategy and the role of the Centre, Schools and Departments. Thirdly it focuses on the role of QR, given its particular features and attributes, in supporting the development of the strategy and its implementation.

2.2 The conceptual framework: locating the role of QR

2.2.1 All the HEI case studies produce a formal statement setting out the broad aims and objectives as well as the key elements of their overall institutional research strategy. These strategies are typically developed and agreed through a diverse range of formal and informal processes of consultation and interaction within and between the Centre, Schools and Departments (including research leaders). Evidence from the case studies also reveals that although their research strategies differ significantly in detail and focus, they typically include the following elements to a greater or lesser degree:

- The overall mission, challenges to be addressed and main aims and objectives of the strategy
- The different internal and external pressures and influences which shape the strategy, including the Research Excellence Framework (REF), Research Council themes and the aims and objectives of external funding organisations (business, charities etc.)
- The main research priorities and broad agenda for the research planning period and degree of alignment of Centre, School and Department research priorities
- The research infrastructure including the current and potential financial position, existing and desired research capability and capacity (staff, equipment, estate and support systems)
- The framework for allocating resources
- The current and developing organisation of research activity including internal management structures, collaborative research arrangements, interdisciplinary research initiatives and Research Centres
- The monitoring of research including performance metrics relating to the quantity and quality of research (publications, etc.), changes in research capability and capacity, the development of new areas of research and the translation of research
- The implications for teaching in the HEI
- The translation of research into the economy and society
- The impacts of the strategy on the HEI, public and private external organisations, public policy development and the wider economy and society

2.2.2 It should be emphasised that the overall research strategy emerges as an amalgam of strategic considerations at the Centre, across the different Schools and across Departments and Research Centres. Moreover, it is individual academics, particularly research leaders, who undertake research and ultimately play an important role in shaping the research strategy of their Departments and Schools.

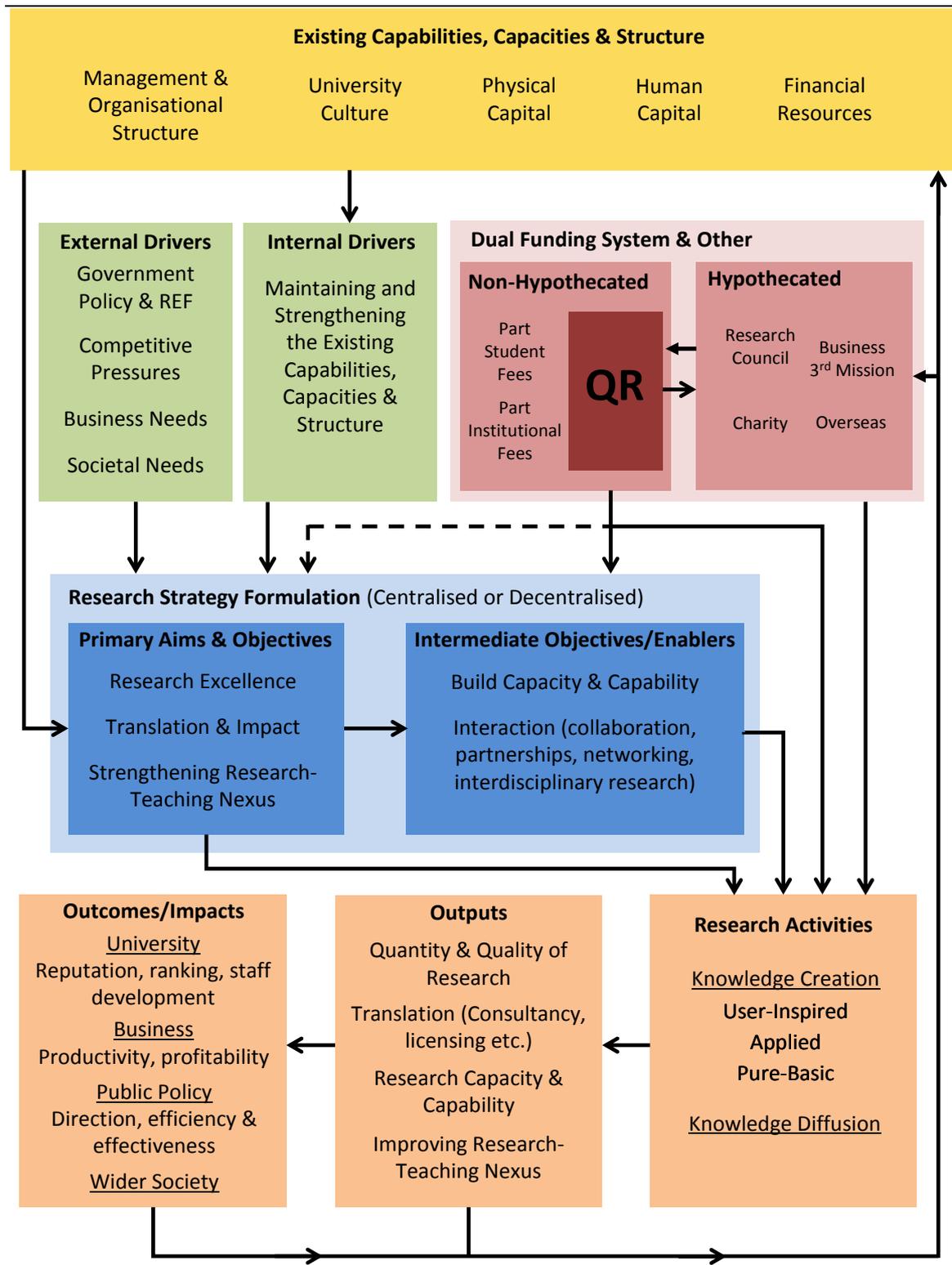
2.2.3 Drawing on the evidence from the case studies, Figure 2.1 presents a simplified and stylised framework identifying the key elements that feed into the development of a research strategy and positions QR within this framework. The top of Figure 2.1 indicates the baseline position of the HEI at the beginning of the strategy development process. This baseline includes the core research infrastructure (physical, human and financial resources), the management and organisational structure and the prevailing culture in the HEI. In the short to medium term, changes

in the baseline are likely to be relatively small as the HEI evolves and develops its portfolio of research and seeks to accommodate and adapt to ongoing pressures to secure more efficient and effective management of resources. HEIs undertake ongoing annual reviews of this gradually evolving baseline to monitor change and identify any emerging unmet needs. Periodic reviews of the research strategy which result in significant strategic shifts and new initiatives may result in changes to the baseline position involving organisational restructuring, the development of new premises, acquisition of new equipment and the recruitment of new academic researchers.

2.2.4 External influences and pressures are also seen as important in shaping strategy development. Through the RAE/REF, government policy is seeking to raise the quantity and quality of HEI research and encourage research with potentially greater user impact. The portfolio of HEI research activity is also being influenced by government policies through HEIF and various other government collaboration and partnership schemes aimed at strengthening research collaboration with business and other organisations. Other external influences, particularly on strategy development in the more research-intensive HEIs, include the increasingly competitive environment for high quality researchers, intensifying global competition in the knowledge intensive sectors and the growing recognition that at the local level HEIs can make an important contribution to economic growth.

2.2.5 Figure 2.1 also highlights the Dual Support system and distinguishes the different funding streams supporting HEI research. QR funding is shown as an important non-hypothecated government funding stream enabling and supporting the strategy. The role it plays in the formulation of the research strategy depends partly on its non-hypothecated status. This permits greater flexibility, stability and planning of research and distinguishes QR funding from the other funding streams shown, such as RC funds or funds from business or philanthropic organisations which are competitive, time-bound and typically focused on securing specific research outputs. It will be argued in Chapter 5 that QR funding plays an important role in complementing and securing other funding streams in support of the research strategy. Through a variety of mechanisms QR funding directly attracts other sources of funding (e.g. as matched funding for RC or other grants) and indirectly through its impact on the quality of research and its translation. The role of QR funding in the research strategy is also contingent on how it is allocated and deployed across the HEI's organisational structure namely the Centre, the Schools and the Departments.

Figure 2.1 Positioning QR in the overall HEI research strategy



Source: PACEC

2.2.6 Figure 2.1 also points to an important distinction emerging from the case studies between the primary or ultimate aims and objectives of the strategy, and the intermediate or enabling objectives. Across both research-intensive and the less research-intensive more teaching-orientated HEIs, the primary aims and objectives of

the research strategy are the achievement of high quality research output, high research impact through the translation of research outputs into the economy and society, better informed public policy decisions and a strengthened research-teaching nexus.

- 2.2.7 Securing intermediate objectives enables and supports the achievement of the primary research objectives. These intermediate objectives are important because they focus on the operational aspects of the research strategy concerned with addressing issues related to the capacity, capability and the organisation of research. In this respect they highlight the role of QR in facilitating and enabling research excellence. They also focus on the question of how QR funding is spent and used to support research through the funding of the core research infrastructure including academic posts, purchase of equipment, maintenance and a wide variety of specific initiatives. For example, the flexibility of QR enables research funding to be directed to strategic priorities within the HEI's existing research capacity and capability or to be used in opening up new areas of research by funding new posts. In this latter respect, QR funding supports the restructuring of existing capability and capacity to enable emerging research opportunities to be exploited. Establishing collaborative research and interdisciplinary research initiatives are also important ways of restructuring and extending research capacity and capability in which QR funding can play an important facilitating role. The establishment of a team of professional staff to support research bids, identify funding opportunities, provide budget and project management advice and facilitate translation is also an important intermediate objective that may be funded in part by QR.
- 2.2.8 The implications of the strategy for research priorities, the type of research, the wider portfolio of research activity, the associated research outputs and the outcomes/impacts are shown at the base of Figure 2.1. QR funding is often associated with pure/basic research concerned only with improving our fundamental understanding in contrast to applied research, but in practice the two are complementary and QR supports both.
- 2.2.9 The main outputs of the research strategy include new knowledge, improved research capability and capacity, and a strengthened research-teaching nexus. Research translation infrastructure is a further potential output. As part of the strategy development process HEIs have developed a number of performance indicators and metrics (e.g. publications, citations) which are used to monitor these outputs from research. The case studies also pointed to important potential feedbacks. For example the quantity and quality of research (research outputs) may in time impact on the capacity of the HEI to secure both QR funding and hypothecated sources of research funding.
- 2.2.10 A variety of different impacts and outcomes flow from the outputs of research activity and reflect the benefits generated by the HEI's research strategy. They take many forms including inter alia jobs created, the development of innovative new products and production processes, increased productivity and profitability of firms, enhanced capabilities and increased personal incomes and wellbeing. These benefits accrue to

the HEI itself including its staff, to businesses, to the public and third sector organisations in the local and national economy and to a wide range of beneficiaries in the global economy.

2.3 Strategy development and the role of QR

Centralisation and decentralisation; the strategy development process and QR

- 2.3.1 The processes and practices used to develop a research strategy at the institutional level and the role of QR in strategy development differ widely across HEIs and the following presents a stylised version of the process and the role of QR in this process.
- 2.3.2 Each of the case study HEIs has an institutional research strategy, agreed and signed off by its Council or equivalent. This strategy was developed (at the Centre) by a Research Strategy group headed by a PVC or Director for Research and supported by a central research administration. Although some high level strategic elements of research are decided at the Centre, the wider strategy is also informed by strategic research considerations and plans developed at the level of the School and the Department. QR funding, usually in conjunction with other sources of funds, is allocated to spending units, directly or via Schools, according to the HEI's resource allocation approach and is usually identifiable as an income stream.
- 2.3.3 An important question is the extent to which the development of the research strategy of the HEI is centralised or decentralised. Much would seem to depend on who is the budget holder and on the decisions made at the Centre, School and Department level with respect to the 'top slicing' of funds allocated for research. At one extreme, the non-hypothecated research budget, including QR, may remain with and be used to support the research strategy developed by the Centre. The research aims and objectives are determined by a senior management team, typically headed by a PVC or equivalent and efforts are made to ensure that the research strategies of Schools and Departments are closely aligned with that of the Centre. The locus of control is the Centre, with Schools or Departments allocated funding through a formulaic approach or through a bidding process. 'Top slicing' of the budget may be used to establish a Strategic Research Fund or be used to support HEI Centre level research priorities or research support facilities. This centralised approach is often found in middle ranking HEIs which have a small number of competitive research areas, whereas the Top Six research-intensive HEIs are, in the words of one respondent, *'ponds full of big fish, if not sharks, and it does not make intellectual or political sense to impose a strategy downwards'*.
- 2.3.4 The decentralised approach is much more bottom-up and the overall strategy of the HEI is more strongly influenced and determined by Schools and Departments, typically loosely coupled with the Centre and exercising greater autonomy than in the centralised approach. At one extreme, funding including QR is allocated directly to Departments who, as budget holders, use it to support the delivery of their strategy

which may also involve an element of 'top slicing'. A decentralised HEI is one in which the Centre seeks to distribute the locus of control and authority much more widely across Departments.

- 2.3.5 Decentralised strategy development also involves Schools to a greater or lesser extent. In those cases where Schools are budget holders, they allocate QR and other research funding streams to Departments and may require each Department to set out the direction of their research and provide a strategic plan, often on an annual basis. These Department level plans may then feed into and influence an overall strategy for the School. This process and any 'top slicing' by the School will reflect strategic decisions at the School level with regard to research priorities, including cross-subsidisation of Departments in deficit, or new research areas requiring funding support. This strategy may subsequently feed into and align with the overall strategy for the HEI.

'Most of the decisions about the research strategy will happen in individual Departments, although there is a School role. Strategic direction is set through planning meetings with each Department, and each Department is asked to set out a research and teaching agenda. The School Council also requires each Department to come up with a strategic plan on an annual basis and the different plans are amalgamated to form the School's overall strategy to be agreed at School Council level. It is very much a bottom up and top down interactive approach between the School and its Departments.'

(Head of School, Top Six HEI)

- 2.3.6 The allocation of funds to Departments at the School level may be made on a collegial basis, whereby agreement on research priorities and other research issues is made consensually, or by a 'managerial decision' by the Head of School following discussions with individual Heads of Department.

'We have several Departments and I do on the whole make the decisions. I am a consultative manager in the sense that I consult my colleagues informally and I have one-to-one meetings with all of my Heads of Department every couple of weeks. For one-to-ones I sit down with each Head of Department for about an hour. We talk and we consult. I also have round tables of my Heads of Department where we report. It's a consultative forum but, in essence, I decide. Very occasionally it does create tensions. I think that there are Heads of Department who may feel that their Department is deserving of a lower target surplus and that I have been too generous to another Department. Departments are aware of their own QR earnings. They don't question the income they receive because they actually get it directly. I do all my adjustments on the bottom line so they get their QR and teaching and then you take it away or give it out as you fit. I set their targets as I see fit.'

(Head of School, Top Six HEI).

- 2.3.7 However, several respondents suggested that cross-School and cross-Department inter-disciplinary research is increasing and shifting strategic decision making of research more towards the Schools and the Centre. This is partly because external conditions have changed, but also because there is a recognition that in order to

maintain excellence, HEIs need to think much more strategically about where they are going to invest in terms of research areas and people.

'We're not here to tell any one individual what to do, or even really to tell Departments or Schools what to do (although I work very closely with Deans in developing initiatives); rather it is more to enable the cross-disciplinary research challenges which the world faces to be addressed.... Excellence across the spectrum must be more than the sum of its parts and therefore an important part of our research strategy is cross-disciplinarity founded on disciplinary excellence.'

(PVC for Research, Top Six HEI)

- 2.3.8 In the development of their research strategies most of the case study HEIs rested somewhere between the two extremes of decentralised and centralised approaches with the Centre, Schools and Departments all playing a role to a greater or lesser extent in setting the context but where decisions on detail and delivery are devolved to Schools and Departments.

'In terms of the broader strategy there is a very clear institutional strategy which is going to produce some fairly uncontroversial, but nevertheless challenging, objectives, and that I think is obviously expected to articulate with the School strategy but it is not terribly prescriptive in terms of its details – it is perhaps prescriptive in terms of the key objectives and performance indicators that go alongside that. So, I think there is a sense to which a context is set but the actual mechanisms of delivery are very much devolved. I think that works reasonably well. There is a kind of financial parallel to that in that QR money is devolved, and it is devolved pretty much in its entirety, so we do get our QR money and are allowed to spend it.'

(Head of School, Medium research HEI)

- 2.3.9 The principle of subsidiarity would also seem to prevail in many of the case study HEIs in that different strategic decisions are taken at different organisation levels. Decisions on HEI wide research initiatives such as inter-School collaboration are being taken at the Centre, decisions on, say, an inter-disciplinary research initiative are taken at the School level and decisions on specific research priorities in particular disciplines are being taken at the Department level.

The importance of the allocation of QR

- 2.3.10 As indicated above, QR is an important input into the strategy development process. In particular, the mode and scale of allocation of QR to the Centre, Schools and Departments through a formulaic or non-formulaic allocation approach plays an important role in determining the relative contribution and influence of these different organisational tiers in the development of the strategy. The case study interviews highlighted the importance of the budget holder, be it the senior management at the Centre, the Head or Dean of School or the Head of Department, in deploying financial resources, in setting strategic priorities and shaping the overall HEI research strategy. As one senior academic in a Top Six HEI with a largely decentralised decision making structure put it:

'The trouble with this university, which is a strength as well, is that all QR with overheads go directly to Departments and there is none that gets held back at the Centre through the as-earned principle. If you have done well in the RAE you benefit. That means that this [School] office has very little money and the Centre, the Vice Chancellor, has very little money and that is where we are completely different to Harvard or Berkeley or any of these other universities we are competing with in the sense there is a sort of budget there at the Centre for doing big strategic initiatives, or for example one major university top-slices QR and is able to do all kinds of cool things with this money and as a result re-organise the university. We don't have that money. You should say well, that seems a bit stupid we should actually hold some back, the difficulty is with our formula.'

(Head of School, Top Six HEI)

- 2.3.11 The importance of who holds the budget is also reflected in the following statement which emphasises the critically important role of the School in one of the case study HEIs.

'Vice provosts have a strategic role but they have no budgets, no money and no troops. The PVC does an incredible amount to first articulate the collective vision, gather the analytics and all of these sorts of things, and he does a lot of work on facilitating some of the activities that need to be done – the creation of inter-disciplinary Research Centres (etc.). But actually, operationally he doesn't do anything.'

(Head of School, Top Six HEI)

The value of QR as a non-hypothecated funding stream

- 2.3.12 As a non-hypothecated funding stream, QR differs from most other government and non-government HEI research funding in that it is not committed to securing any specific research output or wider outcome; indeed, government policy sees this as a virtue in the context of the Dual Support system. In principle, therefore, QR gives HEIs greater autonomy in making discretionary investments in selected areas of research, in cross-subsidising new developments, in restructuring Departments and in promoting novel kinds of interdisciplinary and collaborative research. The greater the proportion of HEI income that is non-hypothecated, the greater the potential strategic autonomy of the HEI.

- 2.3.13 As an approach to funding research in the higher education sector, the Dual Support system commands strong support from the majority of the case study HEIs:

'We support it mainly because of the belief that it is really important for universities to maintain that sense of academic independence that they can pursue things that they think are interesting and that academics can feel free to pursue what they think is interesting and this is true of all top universities internationally.'

(Head of School, Top Six HEI)

- 2.3.14 This approach whereby some money should go to HEIs to enable them to determine their own strategy and some by competition for research, through mechanisms of peer review and in line with national priorities, was seen as very sensible. A number of respondents emphasise the importance of QR in funding very leading edge

research, arguing that RC funding is less likely to be available to support this kind of high risk research activity than for research with more predictable outcomes. One PVC for Research believes that this was particularly important in the context of the UK where, unlike in the US, there are relatively few potential funders and given the difficulty of evaluating very high risk research applications the chances of failing to secure funding, particularly for larger research projects, is much higher in the UK. The UK overcomes this problem by having QR, which can be used to keep really high quality forward-looking research properly funded.

'Now we could say, let's put it all into Research Councils, but I would say that if we were to do that we need more Research Councils not less, because all the money in one pot evaluated in one way is simply not going to be adequate to support what we need. So to that extent I think the Dual Support system is a reasonable and good way to go about it.'

(PVC for Research, Top Six HEI)

- 2.3.15 Arts and Humanities Schools are particularly supportive owing to the high proportion of their research income that comes from QR.

'There is an important question as to whether the balance between QR and RC funding is right because if you look across broad disciplinary categories and map them across the RCs, for example, Humanities gets something like 75% of its income from QR which is well in advance of the other disciplinary areas and if you look at the way research is done and the kind of research that's done that kind of balance seems more or less right for Humanities. In this respect Maths research has affinities with Humanities. By contrast, research in Engineering is often much more focused on the applications end of the pipe line and very targeted towards a clear outcome that often can be commercialised but not always. There is a need to specify with precision what research output you are seeking to produce and that kind of research lends itself better to time limited project funding which is what RC funding is. If research in the Humanities were to go that way and shift towards time limited research then the whole ecosystem of Humanities would change.'

(Head of School of Arts and Humanities, Top Six HEI)

- 2.3.16 There is evidence from previous case study research that in a variety of ways QR has been a very valuable source of funding to support and enable the development and implementation of the research strategy. As an example, the report by HEFCE and Universities UK *Securing world-class research in UK universities* documents over 20 HEI research initiatives in which QR made an important contribution to the funding. The case studies undertaken for the present report confirm and reinforce the findings of this earlier research. Moreover, at the level of the individual HEI these specific attributes of QR are important at all levels of strategy development in the HEI – the Centre, the Schools and the Departments.
- 2.3.17 Firstly, QR is very much seen as a stable source of funding that is more predictable than the winning of research grants. It is widely seen as the stable engine room providing the bedrock research infrastructure to do fundamental research and because of its stability it also provides flexibility. It is very difficult to maintain a major HEI with a great number of research projects running if it is constantly dependent on

funding from a regular turnover of projects secured through competitive bidding. QR as a predictable and stable source of funding underpins the ability not only to secure projects in competitive bidding but also to sustain them.

'Once per annum the University Research Committee gets a briefing note from research finance which says next year's QR allocation will be the following and this is broken down by School. We do not analyse it or interpret it or debate it, we just note it, because it is purely formulaic. We know what QR we are going to get, we know in what proportion it was generated by Schools – it gets devolved back

(Head of School, Medium Research HEI)

'And the reason for that is that QR gives us stability. That is one thing it does really well. And the correspondence between Research Council funding and QR support is really, really high. But it gives you stability. If an engineer goes and wins £5 million from EPSRC then they will need some of that back. As we get funding from QR then that enables us to make strategic decisions in the long-term interest of the institution. And it is the stability that QR gives us which allows that.'

(PVC for Research, High research HEI)

2.3.18 The reliability and certainty of QR was also seen as important in making strategic high-level appointments. One Head of Department at a Top Six HEI observed:

'If one imagined a model [where], say, the equivalent of QR was hypothecated for particular development, then let's say I identify somebody in the Netherlands who I could move and I have funds to recruit them but then I have to tell them I can support you for a relatively short period of time but then you have got to be completely sustainable on external funds afterwards. That would hinder the recruitment because they want to know that they are not going to be cut back to ground zero if their particular proposal does not fly that year. One doesn't want to feather bed people but you want to give them some assurance that the institution has an ongoing commitment to them and is not merely providing as it were hotel accommodation which they have to pay as they go or they are out.'

(Head of Department, Top Six HEI).

2.3.19 Secondly, the non-hypothecation of QR facilitates the restructuring of research activity through the flexibility it allows in developing and implementing the research strategy. It enables HEIs to allocate resources in support of their priority research areas and to reconfigure their research portfolio towards new areas of research if they so choose. When posts become vacant in a Department they can be suppressed in that Department and transferred to another Department which has been given greater priority in the research strategy, perhaps at the School and/or Centre level.

'A School might decide for instance that we want to move into say, stem cell biology, a relatively new area; they took that decision about ten years ago. At Departmental level a post might only come up every 10 years; across a School, you can actually say the 20 posts that are going to become vacant over the next year, in the various areas of science, we will suppress, because we want to make a major new investment in stem cell biology and a School has got the discretion to do that.'

(Director of Resource Allocation, Top Six research HEI.)

- 2.3.20 The Head of School of a Top Six HEI provides another example of how QR funding facilitates restructuring of a School

'I have two areas [of engineering] which I identified fairly early on in my tenure as dean as areas that I should focus on. They are vastly important subjects at the centre of issues of sustainability, energy, and manufacturing – all sorts of things like that. [One] was too small and was marginally underperforming. [The other] was I think underperforming and didn't have the range and types of skills I felt were needed. So I am directing investment into those two Departments. They have lower contribution targets than hitherto and they have a program of staff and facilities investment which we have developed over the next three years which will deliver them to the right point. QR is critical in that process.'

'Pretty much everything we've done in the core engineering and science areas has been enabled by the fact that they are able to attract strong QR. Non-hypothecation of QR is certainly a critical feature of my management; I am able to act strategically and develop areas where we are underperforming. The QR allows me the flexibility I need – we've set up new Departments, we've opened up new research areas, we've invested in research facilities. This would have been pretty much impossible if we were only getting money from research councils.'

(Head. School, Top Six HEI)

- 2.3.21 The ability of Heads of School to use QR funding in this way is of course constrained by the contribution that QR makes along with other funding streams (e.g. student fees) to funding the core tenured posts of the HEI. The case studies indicate that this is a particularly important issue for HEIs in receipt of relatively large amounts of QR funding, which are deeply embedded in the HEIs' financial systems and make a substantial contribution to the overall income and expenditure flows of the HEIs. In this respect the flexibility of QR facilitates a medium to long term process of incremental strategic restructuring rather than enabling short term major shifts in the strategy.

'QR is just seen as a way of paying the salaries, it is not seen as specifically supportive to blue skies research but rather more generally as supportive to the activities of the entire institution.'

(PVC for Research, Top Six HEI)

- 2.3.22 The flexibility enabled by QR funding is also reflected in the ability given to the HEI in supporting discretionary spending on a diversity of initiatives that contribute to the research strategy. (See Chapter 5 for a detailed discussion of what QR funding is spent on.) These are very wide ranging and include, for example, top slicing by the

Centre, the Schools and Departments to establish strategic funds serving different longer term purposes; recruitment of key academic staff and support facilities; support for emerging new areas of research; establishment of specialised Research Centres; support for younger fledgling researchers; equipment; sabbaticals and provision of ‘thinking time’ to plan, complete and publish research; supporting the full economic cost (FEC) of selected restricted funds such as Research Council funds; promotion of novel kinds of collaborative activity and interdisciplinary research; support for translation of research etc.

2.3.23 The flexibility provided by QR also supports the strategic aim of balancing what is academically attractive today against what is likely to yield investment rewards in the future, or as one PVC for Research put it, *‘the balance between adventurism and conservatism’*.

2.3.24 A third important attribute of QR is leverage in that it can be used to attract and lever research funding into the HEI. (See Chapter 4 for a more detailed discussion.) QR is used as matched funding in bidding for certain Research Council funds; in securing internal institutional funding; and in providing research pump priming funds.

2.3.25 A fourth important attribute of QR is that it enables longer term strategic development of research and the development of critical mass.

‘We are talking about tenured academic posts and that’s with us for life almost and Research Councils tend to think three or five years but we are actually thinking of an area which we want to really grow over a period much longer than any Research Council project. So we are thinking of areas that will really complement what we already have so that the whole is bigger than the sum of the parts. So that if we have a group there and a group over there and if we just had this kind of activity in the middle it might eventually coalesce into something bigger and more powerful. If it is successful other people pile in.... Our research strategy is about trying to tackle bigger challenges and identifying cross-cutting strategic themes around which people will want to coalesce. In this respect QR has been very important as a source of recurrent funds through the Research Allocation Model (RAM) because of the strong QR. Once you have the people in place they can grow that Research Council money. We are playing a longer game.’

(Head of Department, Top Six HEI)

2.4 The research strategy – primary and intermediate objectives

Intermediate objectives

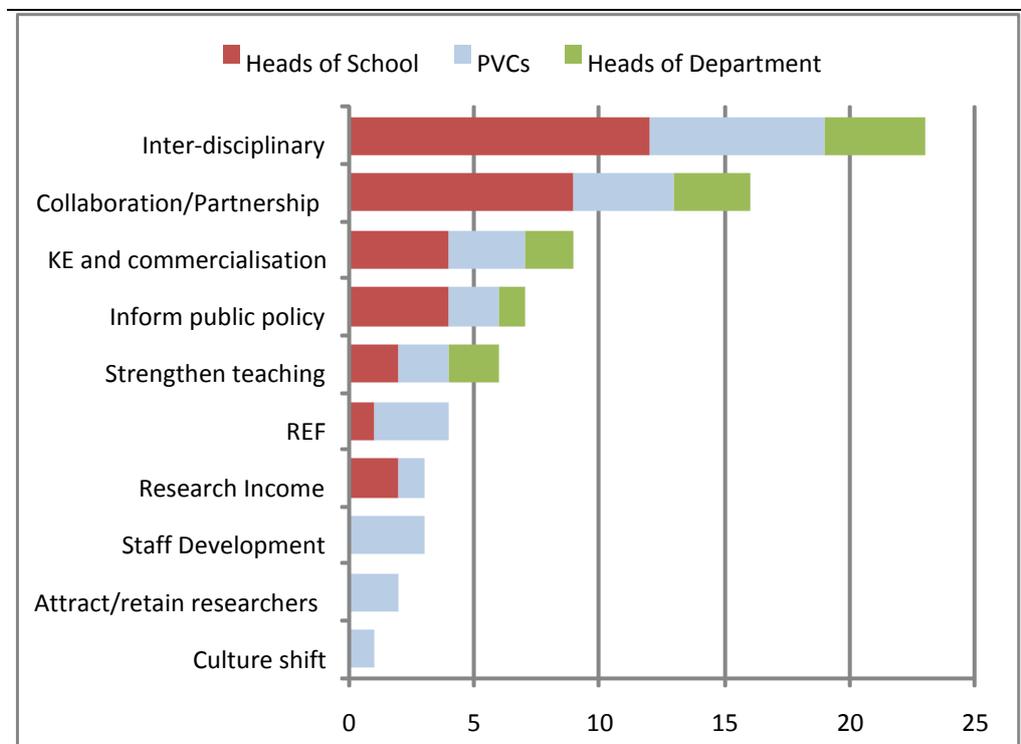
2.4.1 As stated above the intermediate objectives relate to those elements of the HEI’s research strategy which facilitate and enable the primary objectives to be secured. They focus on the operational aspects of research activity and include objectives related to:

- Securing and retaining high quality staff with the capabilities and experience required to strengthen existing areas of research activity and to support and enable the opening up of new areas of research

- Ensuring the required scale and composition of the academic staff across the different disciplines to achieve strategic research priorities
- Training and development of post-graduate students and support for newly appointed fledgling researchers
- Improving and enhancing the research environment through investment and maintenance of high quality buildings and state-of-the-art equipment and other research facilities
- Improvements in the organisation and management of research to increase the efficiency and effectiveness of project management and the wider delivery of the research strategy
- Development of professional research management support
- The need to shape the institutional framework of research activity to facilitate and coordinate interdisciplinary research when it is required achieve the research outputs of the strategy
- The establishment of initiatives to support the development of collaboration and partnership with other UK and foreign HEIs and research institutions
- Partnerships with users of research
- Strengthening the capacity and capability for effective translation of research

2.4.2 The frequency with which these objectives were reported by respondents is shown in Figure 2.2. Encouraging interdisciplinary research emerges as the most frequently cited intermediate objective. Forging collaboration and partnerships with external organisations including other HEIs is also a relatively widely cited objective.

Figure 2.2 Aims and objectives of research strategy (unprompted responses)



Source: PACEC

- 2.4.3 The weight given to each of these objectives in the research strategy does of course vary substantially across the different HEIs but notwithstanding these differences, some there are some common trends. The Top Six HEIs, for example, all put weight on supporting interdisciplinary research and engagement with external organisations, and although the attraction and retention of high quality academic researchers was not frequently cited in response to the unprompted question it nevertheless was important for the research-intensive HEIs.

'Research-intensive universities such as ours are nothing without the individual researchers, so therefore everything that the university does must be in such a way as to support and engage the researchers, nurture them, attract them.'

(PVC for Research, Top Six HEI)

'Universities such as ours with excellence across the spectrum must be more than the sum of its parts and therefore an important part of our research strategy is cross-disciplinarity founded on disciplinary excellence.'

(PVC for Research, Top Six HEI)

The primary aims and objectives of the research strategy

- 2.4.4 For many of the case study HEIs the overriding aims and objectives which give direction and purpose to their research strategy derive explicitly from major socio-economic challenges where the HEI believes its research can potentially make a positive impact. For example, within that context one major Top Six HEI created four institutional grand challenges – 'global health, sustainable cities, intercultural interaction and human wellbeing'. The HEI in question recognised the importance of addressing major societal challenges such as these through its research. However, excellence in research and scholarly impact and strengthening of the research-teaching nexus were seen as centrally important objectives of the research strategy. Whilst recognising the importance of research in addressing major societal challenges such as these, excellence in research and scholarly impact, strengthening of the research-teaching nexus and were seen as centrally important objectives of the research strategy. The relative importance given to the achievement of these objectives differs very significantly across the HEIs in the different research-intensive clusters. Not surprisingly, the REF was also acknowledged by a number of universities as an important driver encouraging improved research output, research quality and translation in the past five years.

- 2.4.5 Five of the Top Six research-led HEIs (Cambridge, Oxford, Imperial, Manchester, Kings and UCL) reported that the achievement of excellence in research across all or the great majority of disciplines was the central aim of their research strategy. They also tended to emphasise the importance of QR in supporting blue skies research and research areas with uncertain but leading edge outputs. These objectives were not to be compromised for the objective of research translation and securing impact through external engagement. As one senior officer at the Centre level put it:

'I think what would absolutely go across to the whole of the university's research strategy is an emphasis on excellence. I don't

think we would ever be in the position of prioritising lower quality because it was particularly of high impact. However, we do see impact as important.'

'We would never minimise the importance of translation and we must absolutely do more to ensure that our high quality research is translated. What I think we would always resist is any notion that we could score some easy translation points by compromising on excellence. That is not where we are at but we recognise that we need to do more about what happens down the pipeline.'

(Director of Resource Management, Top Six HEI)

- 2.4.6 Interviews at the twelve High research case study HEIs confirmed the importance of aiming for research excellence as a primary objective but the majority of respondents (7) emphasised the aim of achieving or maintaining excellence in specific areas where they enjoyed a research strength, rather than across all or the majority of their disciplines. The principal component of the strategy of one High research case study HEI is a focus on quality, but this is also informed by a realistic view that the HEI would not be the best in every area of research but that it could be best or highly competitive in some research areas. The HEI believes it is also important to recognise that it also has areas of real weakness; and at some point it has to 'bite the bullet' and say that it is not going to be competitive in some disciplines, however much resources are given. And the attempt to become more competitive in some areas may require spending very substantial resources in order to achieve a wholesale turnaround, in not only facilities but by recruiting some 'star' (or 'superstar') researchers, which would be difficult in the absence of a track record in those research areas.
- 2.4.7 The PVC for Research at another High research HEI reports that his HEI's research strategy has to be very focused because it is a medium-sized organisation and although required to teach the full range of the medical course for example, nevertheless has chosen not to be active in every research area. It has therefore selected priority research areas which it believes match its strengths but are also of current interest and at an exciting and interesting stage of development.
- 2.4.8 In the medium and low research-intensive HEIs, the focus is again on the opportunity provided by QR to enable them to be research active and to aim for excellence in areas of research strength. The research strategies of these HEIs also gave relatively greater emphasis to applied and user-inspired research with impact. Much more priority and importance was also given to the strengthening of the research-teaching nexus.

2.5 Conclusions

- 2.5.1 All of the case study HEIs have developed overall institutional strategies. These strategies vary from those concerned to provide a broad framework for research activity including the grand challenges and a broad strategic direction for research at the institutional level to much more detailed strategic planning. The latter focus on research priorities, specific initiatives, funding of research including the role of QR

and the research contribution of the different Schools, Departments and Research Centres in meeting the aims and objectives of the strategy.

- 2.5.2 Although a few respondents express doubts about the value of the strategy and indeed whether it really exists, the majority of case study respondents report that the research strategy is a useful and helpful strategic plan which sets out, not only the challenges facing researchers and the broad framework within the HEI for addressing these challenges, but also the main operational adjustments and mechanisms for ensuring effective implementation of the strategy.
- 2.5.3 The development of the strategy also varies across the case study HEIs reflecting the balance between centralised and decentralised decision making practices, the research culture in the HEI and the approach adopted for allocating financial resources. Typically, strategy development is a distributed process, involving to a greater or lesser extent each of the main organisational tiers of the HEI (Centre, School, Department).
- 2.5.4 For the larger research-intensive HEIs, QR is a critically important source of institutional income. In conjunction with other research funding such as Research Council income, charitable income and teaching income, QR funding is deeply embedded in the overall financial structure of the HEI. QR as a non-hypothecated funding flow provides a degree of flexibility, reliability and stability in strategy development. It facilitates the restructuring of research activity and is important in leveraging funds from non-governmental sources.

3 Resource Planning and Allocation of QR Funds

Panel 3.1 Key findings

- *The primary aims of QR funding, in combination with other research funding QR is only rarely used as a free-standing research income stream supporting the HEI's research strategy. Most HEIs aggregate all incomes for purposes of allocation although typically there is transparency with respect to the different sources of income, including QR*
- *The allocation of QR funding typically takes place through the use of a formal resource allocation model (RAM) in conjunction with less formal decision making processes and practices*
- *Four different allocation approaches were identified for allocation whereby the Centre allocates QR funding directly to Schools, Departments or to individual principle investigators (PIs)*
- *A formulaic approach (influenced by the HEFCE allocation formula in 15 of the HEIs) was widely used by the Centre in allocating QR funding, although other factors typically influenced the final allocations, including an element of top slicing*
- *In a small minority of cases (3), the Centre did not follow a formulaic allocation approach. A bidding approach was adopted in one HEI; in another HEI allocation aimed to address specific strategic issues and research priorities; and in one HEI it was based more on 'needs' criteria than on an 'earned' basis*
- *A variety of allocation approaches are used by Schools and Departments. In some case this may follow the HEFCE formula or some variant of it*
- *Alternatively, allocation decisions may be reached 'collegially' using a range of criteria, sometimes involving a bidding process and consultation. A more hierarchical 'managerial' resource allocation approach is also used in some Schools and Departments where decisions are made by the Head of School rather than through a formal consultative process.*

3.1 Introduction

- 3.1.1 The allocation of an HEI's resources inevitably plays a critical role in the support of the institution's overall strategy, including its research strategy discussed in the previous chapter. As the strategic aims and priorities of the HEI develop and change through time, they are matched by appropriate shifts in the allocation of financial and physical resources. HEIs need to manage their resources effectively not only across their academic units but also across their professional services, such as finance, human resources, registry and estates etc., and make sure that they are all pointing in the same direction to the delivery of the institutions' strategy for research and for teaching. In addressing this complex problem of managing their resources efficiently and effectively, HEIs have developed processes that enable them to target different units within the institution with not only generating income, but also how that income is spent. HEIs now use a variety of different resource allocation mechanisms and practices to fund their research, teaching and knowledge exchange.

3.1.2 In many institutions, the allocation mechanism has been formalised into a Resource Allocation Model (RAM). In practice, the RAM may be a formal computerised model driven by formulae, and used in allocating funds and assigning costs to organisational units in the HEI. Alternatively, it may consist of a less formal set of practices for resource allocation. However, as Jarzabkowski (2002) noted, HEIs have different models of resource allocation shaped in accordance with their contextual characteristics of culture, history and structure. Field and Klingert (2001) have also noted that although any resource allocation mechanism will be developed to meet the needs and circumstances of a particular institution, it is likely to be based on some key principles:

- **The strategic fit:** supporting the HEI's mission by matching its finances to its core activities, and supporting the delivery of the institution's strategic objectives and priorities
- **Transparency:** Making clear to all how HEI income streams are earned and allocated
- **Incentives and rewards:** Providing incentives through the allocation of surpluses to reward excellence and discourage inefficiencies and overspending
- **Reliability and predictability:** Ensuring there is a broad consistency between the criteria used in the allocation of government resources to HEIs and the methods of allocation used at the institutional level. But also providing academic spending units with some certainty about the availability and stability of resources over a given period³

3.1.3 In the majority of HEIs the RAM is formal and makes an important contribution to the process by which QR funding is allocated in support of their research strategy. Moreover, it should be recognised that resource allocation is undertaken not only by senior management operating from the Centre, but also at School and Department levels in the HEI, where more informal bargaining approaches may be much more prevalent for allocating funds to spending units. Resource allocation processes are institutionally specific, and this chapter seeks to shed more light on the different approaches and organisational practices in the allocation of QR funding.

3.2 The allocation of QR funding

3.2.1 The starting point in exploring the different mechanisms and models used in HEIs is the method by which government policy allocates QR funding to HEIs in the first place. Government policy allocates mainstream QR funds to HEIs through a formula which rewards past research performance, as reflected in the volume and quality of research outputs indicated by the RAE (REF). In this way government policy concentrates research funding in institutions where there is evidence of research of high quality. In addition, non-mainstream QR funding was introduced in 2005 in respect of income that is derived from charitable foundations, business income and income from post-graduate research students. To the extent that it is linked to business and charity income and PhD programmes, non-mainstream QR is hypothecated funding. The non-hypothecated nature of mainstream QR in turn

³ Trevor Field and Jakob Klingert (2001), *Resource Allocation Models*, Perspective: Policy and Practice in Higher Education, 5:3, 83-88.

enables the institution to choose how to deploy QR funding across its Schools and Departments.

A1.2 QR research funding and its contribution to HEI income

3.2.2 An important question is whether HEIs treat QR as a separate research funding stream when making allocations to Schools or Departments or whether it is combined with other research funding streams and HEI income for purposes of allocation.

3.2.3 We found only a few instances where the institutions or their organisational tiers were using QR as a free-standing research income stream to support their research strategy. The practice in most of the case study HEIs is for QR to be combined with other research funding streams and other sources of HEI income. It is very important to bear this in mind in the discussions in the rest of this chapter. Indeed, the prevailing view among the Directors of Finance and PVCs of Research in almost all the institutions is that it is not always helpful to compartmentalise the different income streams and to say that one stream is used for one purpose and another stream for a different purpose. Indeed, most of the case study HEIs aggregate all incomes, from all sources, for the purposes of allocation, rather than consider them separately as research, teaching or other incomes. This view was particularly noticeable among the top research-intensive HEIs in the sample. As the PVC of one Top Six research HEI put it:

'At the institutional, Faculty or Department level we don't think of our discretionary pot in terms of its components: QR and student fees; we just see it all as money. For instance, we won't think we've got this QR so let's open a new area of research, rather we will think we've got this surplus so let's open a new area of research. This surplus could be from QR but it could also be from student fees, through the removal of student caps or a large influx of Masters or international students, or from a large non-hypothecated donation. It's just like a bank account; the only concern is that there is a surplus there to be used, not where that surplus has come from.'

3.2.4 This was corroborated further by the PVC of another Top Six research HEI reporting that, in practice, QR is not considered and, therefore, used as a separate, free-standing income stream to support the HEI's research strategy. Indeed, the PVC did not believe there were any circumstances where a decision would be made to undertake a specific initiative solely from QR. More generally, QR funds are combined with other income streams for allocation purposes.

3.2.5 We found only one instance where it is possible to say that QR is used as a free-standing income stream to support the research strategy of the institution. At this Medium Research HEI, there is a conscious decision that QR money is not used for anything other than research-related disbursement. Each School in the institution (which is also the spending unit) prepares a business plan each year. Within that business plan the QR is agreed and allocated. The plan works as a bidding document because it puts, against known QR funding, the number of post-doctoral, studentships, for example, that the Schools want on a year-by-year basis. The document also includes what they might achieve with QR money, as well as business

and charity money and other income sources. The plan also gives the number of deliverables, in terms of outputs, so that the HEI can monitor progress. It is not considered that this process has resulted in much year-on-year variation in how QR funding is allocated between the different units, although potentially it could do. But QR is considered to act as a spur to drive research forward.

- 3.2.6 The predominant practice in the sample HEIs is for QR to be used as part of overall HEI income and to provide research funding to support the research strategy irrespective of whether the HEI uses a formal RAM or some other resource allocation mechanism. Indeed, it is true to say most of the HEIs in the study do not distinguish between QR and all other income. A rationale for this practice was provided by the PVC at a High research HEI, who acknowledged this is a choice the institution has necessarily had to make because of its belief that the very fundamental root of the HEI comprises members of staff who are active in both research and teaching. The HEI prefers this model because of the belief that it is good for research, but also because it is good for teaching. The two are considered to support each other, with the same people, in effect, doing both teaching and research.

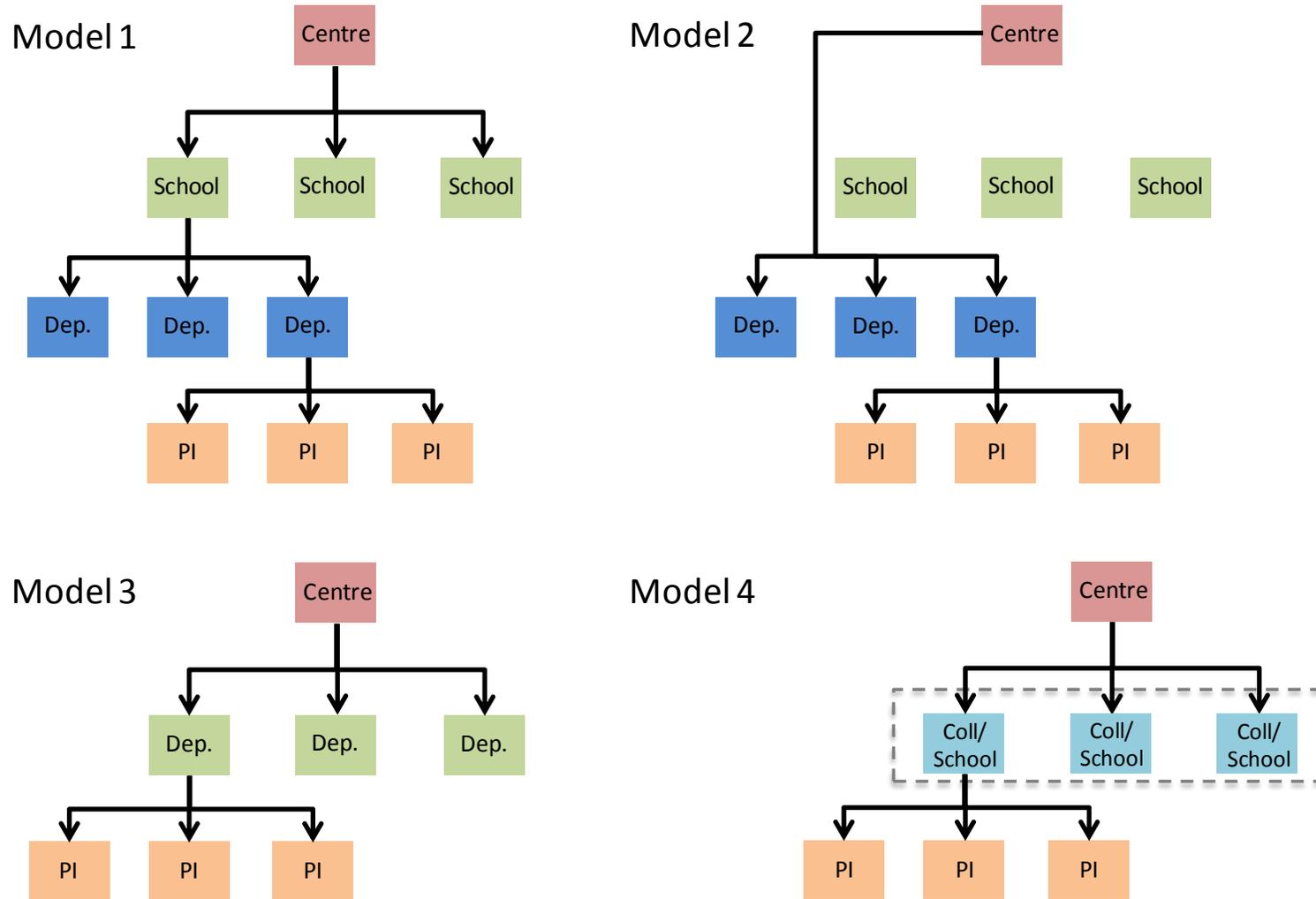
3.3 Allocation models

- 3.3.1 HEIs in England differ in the way they are structured academically. The traditional hierarchical structure consists of Schools (or faculties), within which Departments are located and which may also include Research Centres. For the sake of consistency, this report adopts the following definition of HEI organisational tiers:

- The highest tier is the HEI itself, which we refer to as the Centre
- The second tier is the School, in some institutions variously called a Faculty, College or Division. In this report, we use the term School to describe this second tier organisational level.
- The third tier is the Department, although in some institutions it is referred to as a School. The Department often hosts Research Centres. In many institutions, the Department corresponds to the Unit of Assessment (UoA) for the RAE (or REF).

- 3.3.2 The way in which QR funding is allocated within HEIs is closely related to the way the institutions are structured. It is possible to envisage QR cascading from the Centre (first tier) to Schools (second tier); and from Schools to Departments (third tier); and from Departments to Research Centres, principal investigators and other individual research academics. As might be expected, the allocation procedures and practices differ across the case study HEIs. Four different approaches were identified by which the sample HEIs allocated QR funding; these are shown in Figure 3.1. It is important to point out that the allocation models encapsulate the stylised mechanisms that describe the first stage of the allocation process. The process becomes more complex after this first stage, as second and third tier institutional levels have adopted quite varied criteria for allocating QR funds subsequently.

Figure 3.1 The allocation of QR funding: allocation models



Source: PACEC, 2013.

Model 1 approach

- 3.3.3 In Model 1, the HEI (Centre) allocates QR funding to Schools in the first instance. This is by far the most common process by which QR funds are allocated by the sample HEIs. For the most part, the Schools, which form the second tier of the institutional organisation, are formal academic structures (or umbrellas) within which different academic disciplines (Departments) are embedded. Schools may play an important role in deciding how QR funding is allocated. Typically, they hold the budgets that are subsequently allocated to the constituent Departments in the School.
- 3.3.4 The practice described above is of allocation from the HEI (Centre) to Schools. This contrasts with the experience at two HEIs which have prioritised a number of areas for research, and have purposely coalesced these to form inter-disciplinary structures. In these cases, the Centre allocates QR funding to the inter-disciplinary structures which are managed within the Schools.
- 3.3.5 On the whole, more than half of the HEIs included in this study (16 out of 25) can be classified as using the Model 1 approach, with the allocation of QR funding from the Centre to Schools in the first instance.

Model 2 approach

- 3.3.6 In Model 2, the Centre allocates QR funds directly to Departments in the first instance, without going through Schools. In this model, the Departments are essentially the main cost centres and often have considerable autonomy and flexibility in deploying the QR funds they receive. The HEIs adopting this model are often those with a long-standing tradition whereby the HEI's overall research strategy is heavily influenced and developed through a devolved, 'bottom-up' approach in which the Departments play an important role. Three of the sample HEIs, including two Top Six research HEIs, followed this approach for the allocation of QR funding in the first instance.

Model 3 approach

- 3.3.7 The institutions to which Model 3 applies have a relatively flat structure. There are no Schools forming a second tier organisational level of the HEI. As is normally the case in most HEIs, QR funding is combined with other sources of income and allocated to Departments. The two institutions that use this model of allocation are both High research HEIs.

Model 4 approach

- 3.3.8 Model 4 applied to the two specialist HEIs in the Arts that were included in the sample. These institutions are distinguished from the other sample HEIs by the fact that they submit only one UoA across their constituent Schools for the purposes of the RAE/REF. Thus, although they comprise second tier Schools, it is more

appropriate to consider the whole institution as approximating a large School or Department at a more conventional HEI. These institutions are distinguished further by the fact that the allocation of QR funding is highly centralised. In one of the two HEIs, QR funds are distributed directly to PIs and other research staff. In the other, they go to the Schools and then to PIs in their respective Research Centres.

- 3.3.9 0 summarises the different allocation models by case study HEI research intensity. In the majority of HEIs (16) the Centre allocates QR funding initially to Schools. This allocation approach is used by HEIs at all levels of research intensity.

Table 3.1 Allocation models by HEI research intensity

| | Top Six | High research | Medium research | Low research and Arts | Total |
|--|---------|---------------|-----------------|-----------------------|-------|
| Model 1 Centre allocates to Schools | 3 | 8 | 4 | 1 | 16 |
| Model 2 Centre allocates to Departments, bypassing Schools | 3 | 1 | | | 4 |
| Model 3 Centre allocates to Departments – no Schools | | 2 | | | 2 |
| Model 4 Centre allocates but one unit of assessment | | | | 2 | 2 |
| Total | 6 | 11 | 4 | 3 | 24 |

3.4 Allocation approaches and criteria

- 3.4.1 As might be expected, the internal allocation approach adopted varies across the case study HEIs. Two principal approaches were identified. These coalesce around whether they are driven by a formula or are non-formulaic. Where the approach is formula-based, a further distinction is made between whether it mimicked the HEFCE formula or some other (non-HEFCE) formula. Most of the sample HEIs use a formula-based approach to allocate QR funding. Perhaps even more significantly, they tend to mimic the HEFCE formula (see above). Indeed, more than half of the institutions (15 out of 24 respondents) are using either the HEFCE formula itself or one that is heavily influenced by it.
- 3.4.2 Panel A1.2 summarises the different approaches used by the case study HEIs for allocating QR funding.

Panel A1.1 Method of QR allocation by HEI research intensity

| | Top Six | High | Medium | Low & Arts | Total |
|-------------------------------------|---------|------|--------|------------|-------|
| HEFCE formula or heavily influenced | 6 | 6 | 3 | 1 | 16 |
| Modified HEFCE formula | - | 2 | | - | 2 |
| Non-HEFCE formula | - | 3 | 1 | | 4 |
| Non-formulaic | | | | 2 | 2 |
| Total | 6 | 11 | 4 | 3 | 24 |

HEFCE formula approach

- 3.4.3 This approach allocates QR to those Departments (UoAs) that generate the QR, i.e. QR is allocated internally on an 'as-earned' basis. It was noticeable in particular that all the Top Six research HEIs were using an approach that broadly mimicked the HEFCE formula. As might be expected, the institutions adopting this approach for the allocation of QR funding put forward cogent arguments for doing so. One commonly held view put forward by a PVC for Research of a Top Six HEI was that because the allocation of QR to the HEI reflects research quality, there is no reason not to let QR continue to be allocated to those Departments where it has been 'earned' in the previous research assessment period; the only exception being where a Department has been closed down. Moreover this approach, it was argued, had the merit of being simple and transparent.
- 3.4.4 The PVC argued further that the HEFCE formula allocation approach also acknowledges the contribution that the Departments and Schools have made to the HEI's overall research performance. In recognition of this, the HEI seeks to incentivise them as well as it can. In any case the [RAE] assessment exercise is in line with the HEI's own [research] values to produce excellent outputs that have impacts. It is not considered, therefore, that using the HEFCE formula approach to allocate QR funding compromises these values. On the contrary, this allocation approach drives research quality and output in the direction that the HEI welcomes. The PVC for Research of a High research HEI suggested that one of the major advantages of using a HEFCE formula approach is that the Schools then know exactly where their income comes from and this is important when they are preparing for the REF, or when they are deciding on student admissions. It also means that the Schools and Departments have a much better understanding of their financial position.
- 3.4.5 Another significant advantage attributed to the HEFCE formula allocation approach is the certainty it provides for the long-term planning of resources. Indeed, the Schools and Departments are enabled, through this approach, to take greater responsibility for their financial affairs and not leave that to the Centre. A PVC for research at a Medium research HEI reiterated the importance of transparency provided by the

HEFCE approach. This PVC also had no doubts that the overwhelming advantage of using the HEFCE formula for the allocation is that it drives performance; and, furthermore, that researchers recognise that they are being rewarded for the quality of their academic research. This latter may be described as the fairness rationale.

- 3.4.6 Quite apart from the fairness rationale, the PVC for Research at a Top Six Research HEI considered that the merits of using a HEFCE formula approach must be seen within a wider context of the HEI's capability to do world-leading research. That capability is based around intellectual capital; and that means facilitating individuals with an incentive to be in an environment where they can do truly creative and transformative work. The challenge in doing this is that the HEI cannot help at a higher level than at the individual nodes (Departments) where the transformative work happens; and it is a challenge to make sure that those [Departmental] connections are viable.

Heavily influenced by HEFCE formula approach

- 3.4.7 Two of the case study HEIs, whilst using a formulaic approach to allocate QR funds, were not following strictly the HEFCE formula. Instead, they were using an approach that was influenced in one way or another by the HEFCE formula, or had made some adaptations to the HEFCE formula.

- 3.4.8 At a Medium research HEI, the amount of QR funding allocated to the different Schools is based on a combination of the outcomes of the RAE (2008) and how the profiles of the Departments that earned the QR map onto those Schools. However, there is an adaptation of that to take into account the fact that in the normal course of the allocation process the amount of QR funding that they receive is for the retrospective work that has been done over the previous seven years, but the allocation of QR funding is for the progress that is expected in the future. According to the PVC for Research at this HEI:

'So we identified through this mapping process the areas of strength and critical mass that we wanted to continue to support, but also the elements of developmental areas where we wanted to put some future investment from this funding. So, it's not quite algorithmic; there's an element of recognising the nature of the RAE 2008 and how we generate the [QR] funding, but also how we see importance of an area from a strategy point of view.'

- 3.4.9 The PVC at this HEI suggested it is difficult to follow the HEFCE formula approach strictly as it tends to 'lock' institutions into a position of allocating QR funds according to who has earned it, from the moment they get their QR. But that poses questions about how the Centre makes decisions about investment priorities and how it can adopt a more flexible approach. This is not least because the RAE 2008 was partly based on work that had been done in 2001/02. Consequently, several years on, it is important that the HEI has the flexibility to be able to invest in the future and not be locked into what was achieved in the past. In this regard the HEI made a conscious decision not to simply follow the algorithm-based RAE outcomes.

- 3.4.10 A second example of a non-HEFCE formulaic approach is that followed by a Medium research HEI where research is uniquely organised around research institutes but where the HEI varies the [HEFCE] formula according to an algorithm which reflects how much 3* and 4* research is attributable to a research institute. This takes into account the reduction in its QR income because HEFCE no longer funds 2* research. Hence, the HEI allocates QR funding largely against the research delivery plans of the research institutes. In practice the HEI has a parallel structure of Schools and research institutes and the research delivery plans have to be signed off by the Deans of School who are the budget holders.

Non-HEFCE formula

- 3.4.11 An example of the non-HEFCE formulaic approach for allocation of QR funding is provided by a High research HEI that has what the PVC for Research describes as “an extremely simple model”. All QR income is added up, as are all the costs of academic staff at a Grade 8 level and above – in effect pretty much anybody who is an independent academic. The HEI then divides the bigger figure (QR) by the smaller figure (number of staff). The resulting amount of [QR] funding allows 20% of all academics’ time to be funded by QR. In practice, this HEI operates a workload management system which says that for all academics at Grade 8 and above, 20% of their time is funded by QR. The PVC at this institution argued the merits of the non-HEFCE approach that is used there mainly in terms of its fairness; and also more widely within the context of the overall RAE as the basis for the allocation of QR funding to HEIs in the UK.
- 3.4.12 One High research HEI allocates all funding, including QR, to its Schools using a ‘needs’ based formula rather than on an ‘earned’ basis. According to the PVC here, the reason for using this allocation approach is so that the HEI will be able to maintain a strategic oversight, and be able to iron out uncertainties in funding. This approach also makes allowance for some of the inconsistencies within the [financial] system for the funding of different academic disciplines. For example, the QR [support] ratio for Medicine is 1.6 times that for the Arts; and it is four times more expensive to carry out research in Medicine than it is to do research in Humanities and Social Sciences. However, in terms of magnitude the HEI allocates only 1.6 times income on a quality-related basis to any one discipline area. This implies, for example, that if the HEI operated a simple ‘flow-through’ model, as in the HEFCE formula approach, then it would allocate the most resources to its Business School, and may have to close down its Engineering Department or its Medical School. The HEI has chosen a different approach according to the PVC because:

‘Institutionally, about five years ago, the university decided that we want to be the university that was able to make strategic choices as a whole with investment. From the other places I have worked, there is a de facto transfer of resources from cheaper teaching and research subjects to more expensive ones. But the way that happens is that they have a transparent transfer model where everyone sits down and the Business School will say ‘we earned all the £10 million and you’re giving everything to the biologists’. (PVC, High research HEI)

- 3.4.13 The PVC for Research contended further that the HEI uses this non-HEFCE formula approach for the allocation of QR funds because it is then able to use the funds in a much better way to achieve the aims and objectives of its research strategy. This HEI has established a Fellowship initiative, using mainly QR funds. The PVC, drawing on that and experience from elsewhere, argued that there were distinct advantages for not following a-HEFCE formula approach in this way:

'It is a really major investment. My experience from working both here and in other institutions is that when you allocate the QR directly to the School that so-called earns it, what the School does is that they appoint permanent academic staff to it, and there may be problems with doing that. In the Department that I worked in at [named university] we had 65 hours a year of teaching – that is such low teaching – because they kept on appointing permanent people. But actually it became dysfunctional rather than a functional thing for the institution.'

Non-formulaic

- 3.4.14 Two of the case study HEIs adopted a non-formulaic approach when allocating QR funding. At the first institution, a specialist Arts HEI, it is only over the last few years that research in this institution is being elevated to a much more prominent level. Although the amount of QR funding that is allocated to this HEI is relatively small, the research strategy aims to extract the maximum possible value from that allocation. It is perhaps unsurprising, therefore, that in order to get the best possible out of its QR allocation, the institution has mapped out a number of distinct areas to focus on. The criteria for the allocation of QR funding at this institution include, among other things, the potential to generate high quality output. For example, the HEI has initiated a process whereby individual members of staff have to demonstrate much higher progress in annual research activity and reviews. Based on their potential, the institution would either target extra time for such staff, which would be supported from QR funds, or direct funding for specific activities, again from QR. Another important criterion for the allocation of QR funding is developmental. This is where the institution identifies, say, early career researchers who are considered to have the potential to be successful. One way of supporting them, in this case, would be to pay for peer mentoring, or to give them support to undertake a small piece of research work – as a 'seed corn' for a larger application for further funding. Alternatively, they might be supported to engage in collaborative work within the institution or with an outside third party.
- 3.4.15 For the second institution, the decision not to follow a formula approach has been influenced to a significant extent by strategic considerations. Here, the HEI decides on how much of its QR income it needs to set aside for strategic purposes, and then generally allow bids from Schools into a process which will lead to major change. The allocation is entirely on the merits of the bid and fit to the HEI's strategy. The PVC for Research at this institution believed there were several advantages to following a non-formula allocation approach. First, that the HEI can invest in areas of perceived strategic importance. Second, because the HEI can act relatively quickly with minimum problems, the opportunity cost of funding major change is much reduced.

Third, the approach is more inclusive, in the sense that it encourages a mixture of top-down and bottom-up involvement in the development and implementation of research strategies.

3.5 QR and attribution of costs

- 3.5.1 Most of the HEIs in the sample combine QR funding with other incomes streams for the purposes of allocation, often through the operation of a formal RAM or other resource allocation mechanism. Most of the resource allocation systems in place share the common characteristic that they have a cost recovery component, whereby the HEI attributes costs to the recipients of resources. In practice, HEIs need more than direct costs for running their activities. For example, they need support for capital costs, or need to create an operating surplus, and so on. In the light of what they feel they need to do in their overall business position, HEIs determine what level of contribution they may need from their constituent Schools or Departments. The sort of parameters that HEIs may consider include: the contribution per academic in each Department; the contribution as a percentage of income in the Department; the prevailing student-staff ratio; the balance between teaching and research, between home and overseas students; and, in the context of what is known about the School/Department, how the HEI expects these units to develop.
- 3.5.2 From their total income, the Schools may be expected to meet all of their staff costs (teaching and research), meet all non-pay costs (e.g. laboratories, consumables etc), and meet their share of what may be described as 'corporate charges', i.e. indirect costs (estates costs, premises costs, cost of running finance, HR, the libraries, and other professional support services, which are all central institutional functions). When Schools (or faculties) have met all those costs, they may be allowed to retain whatever income is left over. This means that the resources available to a School, for example, are determined by the number of students they teach, how much QR funding they attract, how much research they do, etc. It might be expected that this model would provide an incentive for Schools to perform at a high level, or seek to improve their overall performance. Although cost recovery practices differ among HEIs, they generally fall into two main categories, of either taxation or charging; and in practice serve the same purpose, to support the provision of general institutional functions.
- 3.5.3 But looking at the parameters for contribution and the associated costs described above, it is clear that there are elements of cost which Schools cannot control; for example, corporate charges, or the HEFCE grant for teaching, or the amount of QR funding. Consequently, what is becoming increasingly important for HEIs in their allocation of resources is to look first at what staff and non-pay budgets the respective constituent units would need to deliver to meet specific institutional requirements. The HEI then sets each School an annual contribution target. This is usually followed by a process whereby the School enters into a dialogue with various groups, and decides what is a feasible target, for example, for student recruitment; what is the feasible target for research; and how those contribution targets can be

delivered. In setting their contribution targets, most of the sample HEIs employ what can be described as a 'cost of activities approach', which recognises the fact that the different academic units will have different complexions, in the sense that they will have different degrees of research intensity, or different levels of balance of undergraduate and post-graduate teaching. Consequently, they have differing levels of contribution rate for different academic functions, depending on their size, their number of students, and so on.

3.5.4 For most of the sample HEIs, it is possible to envisage that the total income that comes into the Schools incorporates QR funding. To that extent, it could also be said that QR in that School is paying for a host of activities which are quite hard to pin down individually. Conversely, where each School is producing a positive level of contribution, that QR funding can be considered as implicitly contributing to a number of support activities going on somewhere else in the institution; for example, an institutional capital programme fund for new buildings, for purchasing various items of equipment etc. In such circumstances, the contributions coming from the Schools to support an institutional capital programme may be regarded as top-slice funds that also include QR.

A1.3 Allocation of QR at lower organisational tiers

3.5.5 The approaches that are used for the allocation of QR funding by the lower organisational tiers, the Schools and Departments in the case study HEIs, are on the whole more complex compared with allocation processes used by the Centre. Irrespective of the approach that is followed by the Centre to allocate QR funds, the Schools and Departments are not mandated to follow it. Notwithstanding the diversity of characteristics found across Schools in the different HEIs, there is a commonality of interest and a desire to form collegial communities. Consequently, Schools and Departments are arguably better placed to make trade-offs and decisions that would not necessarily work across the whole institution. Unsurprisingly, the Schools and Departments differ in the criteria used for the allocation of their QR funds. However, as in almost all of the lower tiers QR is used as part of an overall income stream to support research, it should be recognised that it is sometimes difficult for the Schools and Departments to isolate QR funds per se in the discussions about their approach to the allocation of QR.

Allocation approaches by Schools

3.5.6 One School at a High research HEI allocates QR funds to three Departments. The money is allocated according to the number of full time equivalent (FTE) staff, which means that, for the most part, the amounts going to the Schools are relatively small and are available to enable people to attend research conferences, or to help with publication of their research. The allocation process here is not formulaic. According to the Head of Faculty at this HEI:

'The strategy, if you like, is to encourage excellence across the Faculty, and we don't apportion that QR money in relation to the

outcomes of the RAE. We take it as a pot and we try to use it for the good of the whole Faculty.'

- 3.5.7 Another School in a Top Six research HEI allocates QR funds to the Departments after 'top slicing' a proportion for strategic initiatives. The School 'top slices' to enable it to support not only the HEI's overall aims, but also the overall vision for its own research as well as that of its constituent Departments. By holding back these funds, the School ensures that it retains sufficient flexibility to enable it take account of the specific needs of its constituent Departments. The Associate Dean for Research described the potential conflicts likely to arise if the Faculty did not display that flexibility:

'Let's say you want to start a new area, for example. If the Department does not want to do that, how do you fund it? So we have to have flexibility, and we've got to have good communications up and down that broad structure; for example, from Department to School; and from School to University (Centre).'

- 3.5.8 The element of QR that is set aside goes into a fund that is ultimately used to support research. That fund supports a mixture of specific activities, such as joint initiatives between Schools within the HEI. But it could also be used for recruitment purposes.

'If we want to recruit people we've got to fund those people in some way. That will be by a mixture of some money for teaching, from the element that they teach our undergraduates and some post-graduate students, and it will be some money from the QR to support their research. It won't usually be a one-to-one relationship between the two.'

- 3.5.9 The element of QR funding that is not 'top-sliced' is allocated to the Departments. The allocation approach that the School uses broadly follows the HEFCE formula. The Associate Dean was unhesitant in suggesting that this approach is appropriate because that is the way that QR has been earned in the first place. From that viewpoint, the approach has the great advantage that it is transparent, and people understand that model. But perhaps even more importantly, because the School is 'a great believer in transparency'.

- 3.5.10 Another School at another High research HEI devolves all funding to its constituent Departments, who also control their own budgets. QR funding is combined with other income streams for the purpose of allocation and Departments do not distinguish the QR element in their budgets. The School 'top-slices' a proportion of its overall income before allocation to Departments. The 'top-sliced' element of the QR funding is used for a variety of purposes, but principally to fund the purchase of research facilities (e.g. equipment) for use across the School. The Pro-Dean for Research at this School estimated that about 10% of QR income is set aside in this way. The element of QR that is not 'top-sliced' is considered by the Departments purely as income. The Pro-Dean acknowledged there are potential disadvantages to adhering too strictly to the HEFCE formula, or some other formulaic approach, for the allocation of QR funding. A formulaic approach could, in theory, make it too difficult for a School to support new or early career researchers who had not been submitted or contributed

to the last RAE; or to support new initiatives, such as establishing new areas of research.

- 3.5.11 At the same High research HEI cited in the preceding example, a different School combines QR with other funding streams, which then becomes their “core income” for the purposes of allocation to the constituent Departments. The School does not ‘top-slice’ QR funds directly itself. Instead, the QR funds go to the Departments, and are then clawed back to the School to pay a contribution from their core income. In practice, the contribution is an amount that would be set aside and is, to all intents and purposes, equivalent to top-sliced income. According to the School’s Research Manager:

‘It will be a case of the Heads of Department agreeing with the School management on how that QR would be handled; how much would remain within the Departments, because they would have their own infrastructure and other things to fund. But a proportion would then go as a contribution to fund [those] central strategic activities.’

The element of QR that is not part of the ‘top-slice’ is allocated to the Schools on the basis of their performance in RAE 2008. In this respect, the Faculty replicates the HEFCE formula.

- 3.5.12 The Director for Research at the School argued that the most significant advantage of mimicking the HEFCE formula approach is its transparency. In particular, the direct relationship between performance in the research assessment exercises (RAE/REF) and income streams such as QR funding is valuable and helpful for resourcing the School more generally. But as well, the approach is a good way of incentivising performance. With regard to submission to the REF, this would mean there is a focus on the quality of research and outputs; which is important for career development of academic and research staff.

- 3.5.13 On the other hand, the Director for Research pointed to some disadvantages of the HEFCE formula approach. The most significant disadvantage is that it makes the School much less flexible in some of its decisions, especially in situations where the School may want to invest or disinvest in some activities. There could be an analogous situation, similarly, with regard to up-and-coming research areas that do not yet have a track record of excellence:

‘So, if you’re an early career researcher setting out in an area that did not perform well in the last RAE, you may be the best researcher in the world, but you will not receive any QR for potentially five, six or seven years down the track. So, I think that is a big problem.’

- 3.5.14 A further example of a formulaic approach is that of another High research HEI. The HEI itself runs a devolved budget, so that its three Schools, including this School, receive all their teaching income and research income in a budget. Based on cost drivers, the Centre takes a proportion to run the HEI. The School consists of four teaching Departments (that deliver four degree programmes) and seven research institutes. The Heads of Department have their own budgets and they assess how

much it will cost to deliver their programmes. The School provides the resources they require to do that, by paying all direct salary costs and covering indirect costs. Similarly, the School pays the salaries of research staff in the research institutes, partly from central funds and partly from the School's contributions from research grants. Any money that is left over is distributed to the research institutes to recruit research technicians, or to purchase new equipment. The money given to the research institutes is determined by their size, the actual in-year research contributions and how much income they generated for the HEI. A proportion of the money an institute receives is based on its performance in the RAE but the Faculty has made a decision to cover the salaries of all research staff, and still provide funding to *'oil the wheels'* – for example by providing bridging funds or supporting young researchers.

- 3.5.15 The only way the School is able to support salaries is if researchers secure FEC research grants, even if this is only 80% of costs as is typical. The Faculty PVC acknowledges that even the best researchers will not secure 100% income on FEC grants. Consequently, the only other way that the School can continue to support the full salary costs is if researchers contribute to teaching, which some of them do, and if they bring in QR income.
- 3.5.16 The budgeting process at the School involves forecasting expenditure and income, and whether it expects to turn in a surplus to contribute to the HEI's overall financial position. The Head of School has complete control of the budget and is responsible for how resources are used. The Head of School works closely with his financial team to determine calls on the budget and the School's plans for research and teaching to produce an annual budget statement.
- 3.5.17 The School does not treat QR as a separate research funding stream to support its research strategy. Instead, QR is combined with other funding streams to support research. The Faculty does not 'top-slice' any part of the QR funds before they are allocated.

Allocation by Departments

- 3.5.18 One Head of Department (STEM discipline) at a High research HEI suggested that the institution prides its teaching and research equally. Indeed, the HEI's mantra is *'excellence in research, excellence in teaching.'* Accordingly, in this Department, every member of academic staff both teaches and undertakes research. In this Department, QR funding is not ring-fenced but rolled into the Department's on-going budget. The Department's research committee allocates research funds, including QR to any members of staff applying for funding. The Department also has ring-fenced funds for small schemes such as support for post-doctoral researchers and Research Fellows. Thus, in practice, the QR element of overall research funds is open to all members of the Department.
- 3.5.19 The Head of Department makes the point that the performance of the members of staff who are submitted in the RAE exercise will not be used as the basis for the

provision of research support. Instead, the allocation is based on merit as agreed by the Department's research committee. This committee allocates research funding according to the quality of research that is in effect a bidding process.

3.5.20 Equally important to the allocation approach is a desire to nurture fledgling academics. Hence, the Department encourages applications for research funding from new appointees, younger staff and mid-career staff. The Department also prioritises areas where there are opportunities for inter-disciplinary research across its disciplines.

3.5.21 To a large extent, the Department's allocation approach also pays homage to the collegiality ideal that defines the ethos of the institution itself; and the Head of Department was satisfied that even for that large Department, there were hardly any dissenters, or people who did not think the approach adopted by the Department is a fair and equitable way to allocate QR funds or to support particular groups of researchers who would be disadvantaged otherwise.

'I would say that here there is a collegial view that we would want to support our junior to mid-career staff, and the worry I have for the way that the whole sector is going, is that funding is difficult. I am concerned, less than I was a year ago but I'm still concerned, that we have a group of mid-career academic staff who, in the worst possible scenarios, will never get their second [Research Council] grant. They all got their first grant, and they hit the ground running. [But] because they had to teach, because they had all the responsibilities of an academic member of staff, they didn't quite get the papers written for the second, and they don't get it [the grant], and when times are really tough, then they don't get started again. In the last couple of years we've been monitoring that quite carefully, and trying to really, not only by adjusting teaching loads slightly, but making sure that every one of our academic staff has that opportunity to maintain their research activity and grow their research activity.' (Head of Department, High research HEI)

3.5.22 At one Department in a High research HEI, QR is not regarded as a free-standing [income] stream, but is combined with other funding streams, and used as part of an overall research funding pot. Nevertheless, the Department is aware of the QR element and in budgeting decisions can identify QR as a 'clear line'. Similarly, for the purposes of allocation, the Department does not earmark QR funding in a specific way. The Department follows an *egalitarian* approach for its allocation of QR funds, whereby every member of academic and research staff is entitled to receive an annual amount of funding. The Department has put in place criteria to determine the purposes for which the funds may be used. For example, any equipment purchase must be justified in respect of the research project it is intended to support. The Department works on the principle that staff who have access to [QR] funds are research-active. However, once people have used up their funding allocation they may bid for discretionary funding from another research fund. This discretionary fund also includes some element of QR and is equivalent to a 'top-slice' of the Department's overall QR allocation.

- 3.5.23 The Department does not follow a formula approach for the allocation of its QR funds. The allocation is, instead, informed by the Department's own research priorities and there are clear criteria against which the QR funds must be spent.

'We haven't gone down the road of saying something like, "well, these three professors were really instrumental in getting us the money the last time round, therefore we're going to give them the lion's share of this money". What we have is [to] draw a line under what happened [the] last time. The expectation is that everybody is research active; we know that not everybody is, but the expectation is that that is the case.' (Head of Department, High research HEI)

- 3.5.24 Consequently, the Department aims to encourage staff to be research active, and in particular focuses on supporting junior staff or staff new to the Department. This approach has been followed in the preparation for the REF submissions

- 3.5.25 The Head of Department is confident that it is possible to argue the merits of using a non-formula approach for the allocation of QR funding at the Department, even though this approach may not be appropriate in different circumstances elsewhere. However, the situation and the circumstances of this Department are quite different. The Department itself boasts a number of 'big hitters' – for example, professors who can be described as being "at top of their game". They are among the high profile academics who are able to attract considerable funding from external sources because of their international reputation. Consequently, the Department does not consider that such 'big hitters' necessarily require or need QR funds to support their work; whereas there are younger and junior members of staff who are considered to have good research potential.

3.6 Conclusions

- 3.6.1 The case study evidence demonstrates that although the allocation of QR funding is institutionally specific in many respects, there is nevertheless a degree of commonality with respect to the mechanisms and practices currently in use. QR is in the majority of cases not treated as a free-standing funding stream for allocative purposes but rather combined with other sources of income. Typically, allocation of this income to HEI budget holders is decided using a resource allocation model in combination with discretionary adjustments based on considerations relating to the HEIs overall strategic aims, needs and research priorities. The most prevalent allocative approach is that of an initial allocation to Schools using a HEFCE based formula approach. Allocation by Schools to Departments is more differentiated across HEIs ranging from a 'collegial bidding' approach based on the merits of research bids and influenced by School and Department research strategies to a more 'managed' approach in which School or the Centre plays a major role.

4 Management, Monitoring and Evaluation of QR

Panel 4.1 Key findings

- *Strategic management of research funding is an important element for ensuring effective and efficient use of QR. The majority of HEIs have formal and informal arrangements at the Centre, School and Department organisational tiers. Each HEI has a PVC or equivalent taking responsibility for the overall management of research.*
- *A strategic plan for HEIs incorporating key research aims and priorities is widely used but sometimes seen by academic staff as too general and of limited value as a management tool.*
- *HEIs typically manage QR funding not as a free-standing research funding stream but as part of their overall income flow. This aggregation of QR with other sources of income may persist at the School and Department organisational level.*
- *The institutional structures for managing QR differ across HEIs and range from the strongly decentralised approaches of the most research-intensive HEIs to the more centralised approaches of the smaller less research-intensive HEIs.*
- *Increasing use of QR funding in support of interdisciplinary research to address major research challenges is shifting management responsibilities towards Schools and dedicated research institutes and a greater alignment role for the Centre*
- *Commercialisation and knowledge exchange facilities are evident in all HEIs.*
- *Monitoring of research outputs is undertaken by all case study HEIs, but few HEIs specifically monitored QR related outputs. The RAE is widely used to monitor academic outputs but there is limited systematic evaluation of non-academic outputs and outcomes.*

4.1 Introduction

4.1.1 HEIs need to deploy their QR resources effectively in order to support their research strategies. QR funding has become prominent not only because of the important contribution it makes to the overall financial position of many HEIs, but also because of its role in the financing of research. However, because QR funding is typically combined with income from other sources, HEIs are increasingly faced with the question of how to manage the [QR] element effectively; a problem that is compounded by the fact that QR is contributing to the funding of activities which are often quite hard to pin down. Effective management of QR funding is also increasingly important owing to its important role in securing and sustaining other research funding streams. The challenge is particularly acute with regard to how HEIs might encourage the lower tiers (Schools and Departments) to make good decisions on their use of resources, for example by setting financial targets or by leaving them to decide on spending priorities and monitoring their research performance.

4.2 Management structures at HEI level

- 4.2.1 The management of QR at HEI level is predominantly centralised to the extent that the HEI (Centre) has overall control of the budgets within which QR is located and determines the process by which resources, including QR funding are allocated to Schools and Departments. However, there are differences across the case study HEIs in the structures for managing QR funding streams. For example in some HEIs QR tends to be managed by an executive research committee, with responsibility for assessing competing research funding bids and determining the overall disbursement of research funding. In those cases, where the research committee does not have complete autonomy there is often upward reporting to a finance committee which would include a Director of Finance or Head of Resource Allocation. Under this structure, the overall disbursement of research (QR) funding follows a process of negotiations before it is agreed by the executive research committee, and then signed off by the governing body of the institution.
- 4.2.2 In a slightly more sophisticated management structure, the research committee includes representatives from the senior management of the HEI. The chair of the research committee may work closely with the Vice Chancellor to promote particular initiatives. The research committee also has a wider remit, including pump-priming novel research projects, monitoring and carrying out reviews of initiatives to make sure that they are being run efficiently and in support of the wider HEI research strategy. In some HEIs, in which the research committee has significant autonomy, the committee is also responsible for overseeing the allocation of some part of Centre 'top-sliced' QR funds.
- 4.2.3 In HEIs with highly centralised management structures, the senior management team (Centre) usually takes the lead in managing QR, albeit as a part of the HEI's overall research funding. A member of the senior management team would be in charge of the overall budget [of the HEI]. The budget would be drawn up in consultation with the Head of Finance and the Heads of Schools who would assess the income/expenditure situation in the context of the financial position of the HEI. This group also tends to make decisions about the HEI's spending plans. It typically has considerable autonomy in its decision-making, and would only be required to inform the University Council about its spending plans.
- 4.2.4 The case studies also provided evidence indicating that resource management is becoming more 'professionalised'. A number of HEIs have established a dedicated resource management capability with competencies to oversee and manage all HEI financial resources including QR funding. The majority of HEIs used professional expertise for their management of finances and this was particularly the case for the Top Six HEIs and the High research HEIs. Not only were they often engaged in generating income but also in the financial management of a diverse mix of research funding from the public sector, charitable foundations and industry. Directors of Finance were employed at the Centre and in the larger HEIs often provided support at the School level.

- 4.2.5 In moving towards a more 'managerial professional approach' one High research HEI has set up a Research and Consultancy Service (RCS), comprising a research policy team, a research finance team and an operations team concerned with ethics and governance. The RCS monitors and provides information on all research accounts and funding sources (including QR) for the senior management team (Centre) which is chaired by the Vice Chancellor with final reporting to the University Council
- 4.2.6 In some instances where QR is devolved to the School level, the Centre has control of overall budgets, but the management [of QR] is effectively carried out by the School. Each School is given a general budget and provided with detailed information about income from specific budgets, i.e. so much from teaching, from Research Councils, from industry and from QR. Each School then decides how to allocate these funds. The budget process in such instances tends to be consensual, and to involve a School committee preparing a draft budget. That budget is then shown to a research committee, and then to the HEI Council; with each of these bodies being given the opportunity to comment on the budget and make suggestions until a consensus emerges.
- 4.2.7 Variations of this type of management structure were identified, where QR was managed through School budgets, but with superimposed additional reporting lines of governance. At one Medium research HEI, this was done through a separate Academic Board and an Executive Board. It was the Executive Board that had [executive] mandate over resources, whereas the Academic Board did not. In this case research, from an academic point of view, was reported through a committee of the Academic Board. But issues relating to resources were managed through a sub-committee of the Executive Board that included the PVC [for research], sitting in an executive capacity. The Executive Board was chaired by the Vice Chancellor, and comprised the deputy Vice Chancellors and all the academic Deans. The work of this group focused mainly on issues of the return on research funding, i.e. how QR funds were being spent, and the financial returns that were being generated as a result of that spending.
- 4.2.8 At a Top Six HEI whilst the high level elements of research strategy were carried out by the office of the Vice-Provost for research, it was the Deans (of Schools and Departments), and not the Vice-Provost, who exercised executive financial control. The Provost and Vice-Provosts (Centre), however, still had some involvement in matters of finances through the finance division of the HEI and the Director of Finance.
- 4.2.9 In a few instances, in particular where a formal RAM was employed, the management arrangements for QR appeared quite complex. Thus, at one Top Six HEI, there was some governance around the model itself, through a RAM development group. Such governance seemed important, as any changes to the model also had implications for the allocation of QR funding. Consequently, any such changes were required, crucially, to be approved by a resource management committee that had on it, ex-officio, the Heads of Schools and the Registrar. This group deliberated on competing claims on institutional resources, including QR. In this case, the formulaic approach

was often the starting point for discussions at the resource management committee, although the committee also had discretion not to follow the model.

- 4.2.10 What emerges clearly from the discussions above is that the HEIs have established a variety of formal organisational structures (research committees, boards and working groups at different organisational levels) for managing QR funding streams. These sit predominately within organisational frameworks established for managing their overall income with contributions from research strategy committees or other working groups, through to the governing bodies of the HEIs. The existence of these structures provides an opportunity for the Centre to monitor how QR funds are utilised.

4.3 Management structures at lower tiers

- 4.3.1 Where QR is devolved to a lower tier of the HEI there is also greater responsibility for the use and management of QR funding at that (lower) level. It is perhaps paradoxical that this also provides an opportunity for the control and management (of QR funding) to be vested much more narrowly; such that decisions relating to QR are likely to be made by the Head of School or Head of Department, or a small senior management team. This type of structure is more prevalent in the Top Six research HEIs than in the other HEIs. The management arrangements at a School in one Top Six research HEI illustrate this – although it has an excellent senior management team, the Head of School has very substantial management control and autonomy. Although the senior leadership team at the Centre has a strategic role, they do not control or manage the School budget.

'I report directly to [the Vice Chancellor]. I certainly discuss my Department (School) with him [and] ask for his advice, but he doesn't interfere at all.'

(Head of School, Top Six research HEI)

- 4.3.2 At another Top Six research HEI, those who take resourcing decisions are in a committee made up of the Heads of Departments in the School. Although in practice there is an intention to make collective decisions, the Head of School (in a STEM discipline) acknowledged there had not been any voting on decisions. For the most part, decisions are made only on marginal changes in relation to strategic spending, for example on the choice of research initiatives to be funded. Thus, while the committee would agree the principles, it was the Head of School who would have the ultimate say.
- 4.3.3 At a third Top Six research HEI, the management of QR funding is less straightforward. In practice, there is a formula for allocating QR funds, but the management of QR is devolved from the School to each individual Department. The Dean and executive management team of the School also constitute the School research group, responsible for allocation to Departments. Accountability for how QR funding is used is ultimately governed by how each Department performs against the Faculty's performance matrix, although the two are divorced from one another, with

respect to how QR is managed. Indeed, accountability in the use of QR is not explicitly about how income has been spent by the Department but rather the probable reasons as to why recipients of QR funding may not have achieved their targets. In this regard, the management process is not one of confrontation but how Department management can be improved to raise performance.

- 4.3.4 In some Departments, quite sophisticated management systems and structures have been developed to enable the effective use of QR. One High research HEI Department has established a strong research committee, with wide-ranging responsibilities, including monitoring, scrutinising and reporting on the use of research funds and research outputs from the funding. In this way the Department is able to assess the effectiveness and efficiency of resource allocation, including QR funding. The research committee has the power to look at the track record of individual researchers in receiving research funds and generating research outputs. Evidence from this track record may be used in subsequent funding allocations. The whole process is overseen by the senior management of the Department which, together with other professional managers, forms a wider strategy group.
- 4.3.5 Where the structure of the HEIs accommodates an interceding or overarching tier (for example, an academic college, or division) between the Centre and the lower tiers, QR funding is managed at the college, rather than the School, level. At a High research HEI with this type of structure the Schools are represented on the college or division research committee. The duty of the Heads of School is to provide academic support and manage the performance of individual members of staff with respect to the use of QR funding. However, the Head of College is responsible for research performance across the Schools, including RAE (REF) performance. Consequently, the Heads of School are under great scrutiny to make sure that their academic staff perform at the highest level.
- 4.3.6 A similar approach has been adopted at a Medium research HEI, where QR is being managed in the School as part of general research funds. An inter-disciplinary research group is the main vehicle for allocating QR funding within each School. It is also responsible for overseeing procedures to ensure research outputs are assessed against the research plan. On a day-to-day basis, a School research committee is tasked with overseeing implementation of the research strategy, whilst team leaders within each School have responsibility for ensuring the efficient use of funds. Within this management structure, Heads of Departments are given some latitude and influence in managing QR funding. The success of this management structure is thanks to effective liaison between the research management group and Heads of Department.
- 4.3.7 The structures in place for managing QR tend to be relatively less sophisticated in those institutions where QR funding is largely retained and used by the Centre and not devolved to the School and Department levels. The simplest structures at the lower tiers involve management committees operating across Departments within the School. In one HEI the principal role of the management committee is to monitor the

applications that are submitted for such funding. A further responsibility of the committee is to manage researchers, by balancing people across research projects.

4.3.8 At a second HEI, the structure is much pared down, with only the Head of Department and a Department administrator undertaking a review of the budget every month to ensure the Department is on track, although there is a major review of the budget every six months when QR figures prominently in the discussions. This major review is important, particularly for research projects funded from external sources, such as the Medical Research Council (MRC), or charitable organisations, such as the Wellcome Trust and the Gates Foundation. The role of the senior management team in these circumstances is to ensure that the indirect costs associated with those projects are adequately covered by the funders. The significance of this is that indirect costs can help pay for the salaries of project support staff; and where this is not available (or forthcoming) the Department has to draw upon its QR allocation to cover those costs.

4.3.9 There are other instances, however, where QR is managed in a more centralised fashion at the lower tier, as part of general funds. A number of Schools, at High research HEIs in particular, have such a structure. The need for more central control was necessitated by the different resource needs of Departments within the School and the necessity for cross-subsidisation of one or more 'deficit' Departments by others in surplus.

'We've got Departments of five people, seven people and 20 people, and we're trying to use what scarce resources we've got for research to produce the best research, and we see this as a School endeavour. Some parts of research cost more in some Departments than in others in the Faculty. Quite clearly research is more expensive in Archaeology than it is in English, for instance.'

(Head of Faculty, High research HEI)

4.3.10 At another HEI, where QR is the only source of research funding, the School research committee exercises substantial control and responsibility for how QR funding is used by individuals. In that regard, the research committee holds researchers to account for such things as application for study leave, and could potentially vary teaching loads during periods of intensive research activities. Individuals are required to present a reasonable defence of why they might need more research than teaching time. The resource needs of different Departments in the School are also a significant factor influencing the adoption of more centralised approach to managing QR at the School tier.

4.4 Accountability in QR spending

4.4.1 To a large extent, the management structures that HEIs have in place for research funding are indicative of the transparency of the distribution process of QR funding at the various tiers of the institutions. The management structures also serve to highlight the fact that the leadership group at the Centre, and the senior management group at lower tiers, enjoy a high degree of autonomy in their allocation of QR funding; at least

to the extent that they were not required to report to another body to ratify their proposals. However, the management process still raises an important issue about the way in which accountability in the use of QR is operated at different levels of the HEI.

- 4.4.2 The evidence from the interviews presents a mixed picture. At one end of the spectrum, control over what to spend QR funds on is more likely to be exercised by a single individual in their capacity as head of the HEI, or Head of School, or PVC for Research. In the most clear exposition of concentration of control and, therefore, accountability in this way, it is the Director (Vice Chancellor) of a High research HEI who makes the decision on what to spend QR funds on, albeit after [limited] consultation and advice from elsewhere in the institution. Slightly removed from dominance by one individual, there are instances where accountability responsibility is split; between a committee that with direct control over only a portion of total QR funds, and senior management that exercises control over the remaining portion. In both of the examples described, it is largely assumed that those making the decisions are also accountable for their actions, although there is no evidence to indicate that accountability is ensured or enforced in any way. The view of a Dean of Research is pertinent in this respect:

'The question is who provides that accountability. Certainly there hasn't been a systematic method of calling me to account. I think there has been an assumption that as long as it looks like we are generating good outcomes, then the money is being spent well. But there is not a metrical measurement.'

- 4.4.3 The evidence above highlights the split responsibility for accountability in some HEIs; such that decisions on spending of QR funding are made at the Centre, by the senior management group, and at School level by the Heads of School who are the budget holders. In one Medium research HEI, there is almost a parallel structure, so that research delivery plans have to be signed off by the Deans of School, as part of the key performance indicators (KPIs) related to research activity, which are used for monitoring research performance and progress.

- 4.4.4 More generally, however, the HEIs have good processes of accountability in the use of QR funding, with accountability operating in numerous directions and at different levels within the HEI. In one High research HEI, the accountability process is quite elaborate. Heads of School are armed with TRAC data, showing their income and costs and information on the spending from different income sources. Here, the Heads of School are accountable to both a University Executive Board and a Provost's group for the spending decisions they make. According to the PVC (Research):

'When I sit in that room I'm going to be meeting with the heads of colleges every month to talk through exactly what they are doing, and to understand what they are doing, and to stop them from doing things that they are not supposed to be doing.'

- 4.4.5 The Provost's group at this HEI is itself formally accountable to a strategic sub-group of the University Council, which meets every two months to review budgetary decisions.
- 4.4.6 Where QR is largely devolved to the lower tiers of the HEI, the Schools also tend to have a high degree of autonomy over the use of QR funds. Nevertheless, in a number of cases the Centre still maintains oversight of QR spending to the extent that Heads of School (Deans), as budget holders, are accountable to the Centre for their overall budgets. This is the situation at one Top Six research HEI, where there is no separate reporting line on the use funds. However, the HEI has an annual planning and accountability cycle, which reviews the activity of each School at a certain point and, as part of this process, can influence the resources coming to the Schools by varying the contribution rates they make and also through their access to institution-wide initiatives such as interdisciplinary initiatives that are supported from central funds. This means that, although in theory the Deans of School make all the decisions about the use of their incomes, in practice, they still need to ensure that the School research strategy and HEI strategy are in broad alignment.

4.5 Monitoring and evaluation of QR at HEI level

- 4.5.1 On the whole, the case study HEIs vary considerably in the extent to which they have procedures or processes for monitoring and evaluating QR spending. Some HEIs have set out criteria and metrics for monitoring and evaluating the performance of QR recipients, either as outputs or measurable outcomes. In many HEIs, however, monitoring appeared to be carried out by proxy, principally through the research assessment exercises and, to a lesser extent, through metrics focusing on Third Mission activity and research income raised from charities and other sources including Research Councils and industry.
- 4.5.2 At one Top Six research HEI, the RAE (REF) was described straightforwardly as the major way in which the institution monitored and evaluated QR. According to the PVC for Research, the rationale is that it seems to be an extremely good way for doing so, but particularly because it is also tied to the general research programme of the HEI. The use of the REF in this way has become almost formalised, to such extent that at another Top Six HEI there are two arms to the performance and evaluation system; one of which is through a General Board Review that considers the results of the RAE or REF when assessing the performance of Schools and Departments. At this HEI, too, the practice has been extended into an interim exercise between RAEs, to look at whether or not Departments are moving in the right direction. Similarly, at another High research HEI there is a formalised annual internal 'mini REF', where people submit their research outputs, and they are looked at by team leaders, reviewed and given scores. In this way there is information across the whole institution about who is publishing, or not, as the case may be, and the quality of the publications.

These different approaches to the monitoring and evaluation of research funding (including QR) are indicative of a widespread trend towards establishing more formalised and systematic monitoring in the HEI.

- 4.5.3 It is important to recognise that notwithstanding the increasing prominence given to the RAE/REF in monitoring and evaluation, there is scepticism about using the assessment exercise as a performance management tool for QR. The PVC for Research at one Top Six research HEI considered that the use of the REF in this way was inappropriate and represented a weakness in the management of QR, by creating an impression that monitoring is more of a one-off activity.

'We get driven that way because we don't have a better way of doing it. The REF has a different purpose, and we don't want to create the idea that the REF is the performance management tool. At the moment it occurs that way even when we are conscious that we need to create something that is continuous evaluation year on year, of an individual's research so that we have the opportunity to intervene and to provide coaching and development at the individual level.'

- 4.5.4 This HEI is seeking to 'de-couple' the REF from the process of monitoring QR funding and has plans to introduce more routine performance management of recipients (of QR) against research objectives. This, it is argued, will make monitoring an ongoing process rather than a once-every-five-years process.

4.6 Monitoring and evaluation of QR at lower tiers

- 4.6.1 Compared with the Centre, monitoring of QR is more widespread and systematic in the lower tiers of the case study HEIs. This is particularly the case for Schools in the smaller, often specialist institutions, which because of their size need to be flexible in their use of resources from one year to another. In these cases it is important for QR to be monitored specifically rather than as part of a monitoring process covering all research funding and spending.

- 4.6.2 At one High research HEI, there is a formal system whereby the School (in Arts & Humanities) monitors the use of QR through its performance and development reviews (PDRs). There are annual meetings of senior members of the School plus four or five other members of staff, in which the research, teaching and administration achievements of staff of the School are reviewed. A report is sent to the Head of School for comment, and then forwarded to senior staff at the HEI (Centre) for an assessment of the quality of the research undertaken by the different members of staff of the School.

- 4.6.3 There is also some evidence from the case studies to suggest that the process of staff development is increasingly being extended and used to provide a more comprehensive research audit. It is perhaps unsurprising that the use of PDRs at the lower tiers has increased, particularly in recent years. This is not least because the most significant use of QR funding at that level is to buy researchers' time.

Consequently, at one School in a High research HEI, the PDR plays a role in setting workload norms and expectations in terms of what individuals are delivering both in teaching and research and in research outputs that lead to further grants. The PDR enables researchers to see how they should be improving and where their focus should be.

- 4.6.4 A few lower tier organisations have resorted to using the REF as the principal tool for monitoring QR spending and this is typically the case where there is no good management information system in place. The Head of School at a Top Six research HEI acknowledged as much. In this School monitoring is being carried out in an ad hoc way, as a means of looking closely at the outcomes of the REF and at impacts as the only guide to performance in the use of QR funds. In other HEIs, however, the use of the RAE/REF is not a last resort or arbitrary, but rather an established performance tool and source of metrics. Thus, another School at a High research HEI has spent a great deal of time over the last two years examining individuals' research outputs in relation to their to [their] research inputs and the research environment supported by QR. This involves a great deal of internal scrutiny of every research active member of staff, and for each research group. The monitoring percolates to Department level, where individuals are required to provide evidence of publications, and future grant priorities.
- 4.6.5 The more systematic approaches to monitoring and evaluation of QR involve not only the establishment of process, but also details of responsibilities, the type of information gathered, and the use of that information for particular purposes. An example of this approach is a Department in a High research HEI. Although the research committee has a role in monitoring and evaluation, the key people overseeing the process are the senior management of the Department: the Head of Department, the Associate Head of Department, the Chair of the Research Committee, and the Chair of the Board of Studies. Together, that group covers areas of responsibility in teaching and research in the Department. But there are further inputs from professional managers, such as the Director of Finance and the Director of Facilities and Infrastructure, to form a wider strategy group, which looks at budgets and incoming proposals for the budgets. The research committee has the power to look at researchers' track records in receiving QR funds and at their research outputs. Moreover, where someone has not used their funding appropriately they lose prioritisation in the next round. This is also true for PhD studentships for which QR funds might be allocated to purchase equipment or provide some other support.
- 4.6.6 A second example is a Department which monitors QR funds allocated to individuals and their use of these funds. The Department provides researchers with information on how workloads are allocated, the monitoring processes involved and the rules and criteria that are used for the allocation of QR funds. The Department has not gone as far as to consider the use of sanctions from the result of the monitoring process. In principle sanctions may come into play with the use of discretionary funds that are set aside from the QR allocation; although the Department argues that if individuals benefit from the allocation of funds but without commensurate outputs, then it is unlikely that they will continue to be supported in their research.

4.7 Conclusions

- 4.7.1 There is widespread recognition across HEIs of the importance of the strategic management of research, although in a few HEIs there was a degree of scepticism as to its value. What is clear is that management of research is organisationally distributed, involving the Centre, Schools and Departments to a greater or lesser degree depending on the circumstances of the HEI, its prevailing culture and history. In some HEIs the management of research is heavily concentrated in the Centre, albeit informed by lines of communication with Schools and Departments. In other HEIs the management of research is devolved to Schools and Departments and this is reflected in the budget process and resource allocation approaches adopted. Professional support is widely used, particularly with respect to financial management and research support and management activities such as identification of opportunities, fund raising and engagement with external organisations. Persistent pressures to enhance efficiency and effectiveness are leading to the development of a variety of different management tools, including for example financial target setting at the School and Department level and improved metrics for monitoring and evaluation. Performance monitoring is widespread although evaluation of the benefits of research to the HEI or to external users is more limited.

5 Relationship of QR to Other Funding Streams

Panel 5.1 Key findings

- *HEIs are increasingly seeking funding from multiple sources for several reasons. Public sector funds are constrained and it is prudent to diversify funding sources in the current financial situation. Other important sources of research funding include charitable foundations and industry.*
- *Research Council funding and funding from charitable foundations do not meet the Full Economic Cost (FEC) of the research that they support. QR as an important non-hypothecated funding stream is widely used to contribute to meeting any shortfall in FEC.*
- *Non-mainstream QR (charity support, business-related research and research degree programme [RDP]) funding is crucially important in keeping strategic charitable funding in the UK and in meeting any shortfall on FEC.*
- *In a number of HEIs, QR contributes to the funding of specialised Research Centres as well as infrastructure and capability for encouraging HEI engagement with industry, both of which attract industry funding for HEI research.*
- *QR is also used to leverage internal institutional funds and EU grants by providing matching funding.*

5.1 Introduction

5.1.1 A plurality of research funding sources is not only encouraged by government, but is also seen as necessary and desirable by the higher education sector. Funding support from business and charitable bodies complements public sector government funding for research, and strengthens translation and closer interaction with a range of external organisations. A diversity of funding sources identifies new opportunities for collaborative research and opens up new pathways for engagement. The ability to access multiple sources of funding is increasingly considered to be important for keeping high quality, leading edge research properly funded.

5.1.2 Two recent developments have shaped the way that research is funded under the Dual Support system. The first is the introduction of substantial non-mainstream QR funding that is linked to the attraction of funding from charities and business, and for PhD programmes. Non-mainstream QR funding has grown significantly since its introduction in 2005, during which time mainstream QR funding has remained static or declined, so that it now represents about one-third of total QR funding. However, by its nature, non-mainstream QR funding is uncertain and unpredictable and does not easily allow HEIs to plan future research activities with a high degree of confidence. The second development is the adoption of a full economic cost (FEC) framework by the Research Councils, which followed the review of the Dual Support system in the Science and Innovation Framework 2004-2014. FEC funding means that in their proposals HEIs must indicate the full cost of academic staff time, the use of the institution's facilities, estates and indirect costs. The research councils then pay only a proportion of these costs (usually 80%).

5.2 Use of QR in supporting FEC and leveraging other sources of income

5.2.1 Mainstream QR appears to play an important part in all of these developments; in mitigating the imprecision and uncertainty that is associated with leading edge research, by underpinning that research; and in covering the indirect costs generated by research while working with Research Councils and charities under the FEC model. The extent to which these occur, however, is influenced in a significant way by the relationship of QR to the other income streams that are used to support research in HEIs. This highlights, further, the role that QR plays in securing external research funding for HEIs. That role can be best described in terms of how some HEIs leverage external grants and other funding from UK Research Councils, other government Departments or agencies and charitable foundations. It is often QR that provides the contribution or matched funding. Moreover, the bidding for and writing up of the research is often supported from QR funds (as we shall see later in Chapter 6).

5.2.2 There are examples of initiatives where QR funds support the initial work that subsequently enables researchers to become experts in their fields and, consequently, more successful in attracting funding from a wider range of external sources. An example is an Associate Dean of Research at one HEI who as a member of academic staff, but also a highly active researcher, started as a Research Fellow several years ago. All the research funding received during this time came through HEFCE research and teaching money, including QR funding. This supported a successful programme of research leading to a number of publications, and a greatly enhanced reputation and elevated position for the researcher. As a consequence the Associate Dean is now better placed to bid successfully for other funding and is now principal investigator (PI) for part of a large scale AHRC funded research project and has bid successfully for a Leverhulme grant to develop new collaborative research projects. According to the PVC for Research at this institution:

'Out of this QR funding has come external funding which in turn will then generate, we hope, projects that will then hopefully attract further funding.'

5.2.3 Few research funders pay 100% of costs. Indeed, many of the case study HEIs reported that they lose money on project-specific research, often substantially so on charity-funded research, and just about break even on some of the industry-funded research. HEIs have to use some of their QR funds and other institutional funds to cover the full cost of research. QR is often insufficient to make up the shortfall entirely. The problem is particularly acute in the research-intensive HEIs with large external research income. Moreover, in a number of the case study HEIs the direct and indirect costs of research that are met from the general income of HEIs very often exceed the amount of QR funding that they receive. Consequently some HEIs, particularly among the Top Six research HEIs, subsidise research in a significant way from internal sources such as endowment income and from dividends on investments.

- 5.2.4 An important question is whether HEIs use QR funding to attract other research funding streams as an explicit part of their overall research strategy. One might assume that HEIs would encourage and promote bidding and the use of QR to secure funding sources in support of their different areas of research activity. Interviews with PVCs indicated, however, that in practice they were more likely to adopt a more pragmatic approach; filtering the various funding streams to their specific goals rather than putting resources into writing bids which have little chance of success. The employment of an intelligent filtering process enables HEIs to set some expectations of the levels of external funding expected from leveraging QR and to better target their use of QR funding.
- 5.2.5 Some HEIs did not have an explicit strategy for using QR funds for leverage. Nevertheless, there was still an expectation that Schools and Departments should always be looking for an opportunity to leverage other sources of funding, particularly in the sciences where research is relatively expensive compared with other disciplines.

5.3 QR and attraction of Research Council funding

- 5.3.1 The discussion so far gives some indication of the way in which QR provides institutions with the capacity and the flexibility to support the process of acquiring additional external research funding. Funding from UK Research Councils (RCs) is important in this respect. However, two developments have changed the research funding landscape in a significant way. The first is an increased level of competition for RC funding that has led HEIs to develop specific strategies to target that source. The second is that RCs increasingly attach conditions to their award of grant funding that requires contributions from the recipient HEIs. In both cases, QR makes it possible for HEIs to bid for, and secure, that RC funding. Indeed, the evidence from the interviews points to a trend whereby RCs appear to be saying they would give an institution ‘this much’ if the institution contributes ‘that’. As the PVC for Research at one Top Six research HEI noted, it is widely assumed that “the ‘that’ which the HEIs are contributing could be coming from QR or [student] fees, as both are non-hypothecated”. It is widely perceived by the case study HEIs that there is a general expectation on the part of RCs that some institutional funding support might come out of QR, with some RCs making this explicit in their calls for bids, as was noted by the respondent below:

‘For example, the BBSRC call on synthetic biology says explicitly in the call we’re expecting institutional support. That would almost certainly come out of the QR, there is essentially no other source of money for it to come from’

(PVC for Research, Top Six research HEI)

- 5.3.2 The requirement for a contribution from HEIs is even more explicit with regard to RC funding that is earmarked for equipment purchase. Here, too, the PVC for Research at a Top Six research HEI reported that a grant from the RC for a piece of equipment would only fund 50% of that, leaving the HEI to fund the rest out of its own resources.

This particular institution receives on average around £4 million a year historically for equipment, and has set aside £2 million within its institutional budget to match the 50% requirement.

'What we've said is that out of our contribution charge, we've set aside an element within the budget for the institution which will match anything the Research Councils offer us.... So anything that comes from Research Councils we have to match, and we anticipate that in how we utilise our contribution charges.'

(PVC for Research, Top Six research HEI)

- 5.3.3 The same appears to be true for post-graduate studentships and new research posts that are linked to RC grant projects where HEIs are, similarly, asked to provide matched funding for the external funds from RCs. For example, an EPSRC post-doctoral training centre located at a High research HEI indicated that it is expected to fund its own studentships. In such cases, the HEI makes a contribution of 20% of the costs and it is QR which funds it. The PVC for Research here noted that both the RCs and charities now ask for contributions from HEIs as de rigueur. The HEI accepts that this practice would continue, and would like to put itself in a situation where it is not responding in reactive way.

'What we want to be doing is to get ourselves in a position where we have a strategy which would use QR, which then aligns with the research grant application. So when we write the letter of support for the research grant application we can talk about our strategy; and QR gives you the ability and funds to do that strategically and get the alignment. Otherwise if you are just reacting to each research grant that comes in, and you put some money in, it's not a good thing.'

(PVC for Research, High research HEI)

- 5.3.4 The majority of the HEIs in the study reported they were using QR as part of their overall research strategy to attract RC funding. The need to do so was particularly apposite with regard to new areas of research, where funders need to be convinced about the merits of the proposals that are submitted for funding. The PVC at the High research HEI cited above explained the thinking behind their adopting this approach:

'If you're going to make a big proposal in the area of graphene, or a CDT in graphene, and you just simply toss in some studentships, that's not as good as actually thinking strategically about what you want to do in graphene. What does the institution need? Well, it needs a new chair in this position, or it needs some university research funds in this position; and then putting the money there, and then putting that against the research in the CDT, rather than using the money up simply to do the same thing that the EPSRC are doing, which doesn't sound sensible'

(PVC for Research, High research HEI)

- 5.3.5 As part of their strategic approach in using QR to attract RC funding, some HEIs have also made big investments in inter-disciplinary research initiatives. At one High research HEI there have been 12 of these so far, that have attracted about £8 million of funding from a variety of (external) sources over the last four years. The projects that have been supported have included robotics; and the HEI has recently submitted a £5 million bid to the EPSRC on robotics. The PVC for Research was confident the

institution stood a good chance of being successful with the bid. The focus has been on building inter-disciplinary capacity, with the expectation that researchers would then go out and raise research funds from the RCs and from industry as well. Indeed, in this example, the robotics bid to the RC included a £2 million element in the form of a contribution from a number of industry partners. There was, lastly, evidence to suggest that although its use was not related to direct research grants, QR was, nevertheless, making a contribution to longer-term planning, by helping to fund pilot studies, internships for students, as well as PhD studentships. In this way QR may be considered to be acting as pre-cursor funding to get people to a position where they could make applications to RCs in their own right. The PVC at a High research HEI provided the rationale for the institution's strategic approach to planning for the future in this way.

'For example we've got a number of these doctoral training centres and we've agreed to match, in some cases, one-for-one PhD studentships. So in order to get that funding we've had to use what in effect is our freeboard money, which is our QR money; [using] that funding to pay for PhD studentships, without which we wouldn't have been able to bid for, and won the funding from for the doctoral training centres.'

(PVC for Research, High research HEI)

- 5.3.6 Only a few of the HEIs claimed they did not specifically use QR to attract RC funding, relying instead on other internal funding arrangements to provide the necessary financial support. One such High research HEI had established a Director's Strategic Fund, which provides financial support for bidding to RCs. The Strategic Fund itself is supported from incomes that are generated from residences, conferences and catering. According to the PVC for Research, the fund is a sizeable sum of money that can be used for several purposes, including pump-priming activities and contingencies. In recent years the fund has supported a Research Centre as a host institution contribution to leverage of large external grants, particularly from the ESRC, with the HEI making a promise that if the grant was awarded, it would fund the Centre's staff time.

Attraction of Research Council funding at lower tiers

- 5.3.7 There was much less evidence to suggest that QR is used in a systematic way to support the attraction of RC funding or other research funding streams at the lower tiers of the HEIs. The reasons for this varied. In some cases it was because the School or Department was 'too far down the pyramid' to be able to think in those terms, and such decisions were taken more appropriately at higher levels of the institution. In other cases it was because the amount of QR funds going to the lower tiers was too small to make a significant impact. Consequently, at the lower level there was more emphasis on building research capacity first, in order to be then able to make bid applications to RCs with confidence. This may include, for example, investing in new research facilities and making new appointments of experienced researchers; as in the case of a STEM School at a Top Six research HEI:

'Pretty much everything we've done in the core engineering and

science areas has been enabled by the fact that they are able to attract strong QR. [We] invest in the base capability so then [we] can go to the Research Councils and secure funding. For example, [we] might make a judgement to renew the Chemical Engineering Department. [We] decide to get somebody with a new set of skills who might open up a new area in chemical engineering and now that person has secured significant EPSRC funding. That was investment choice to do that and then that person was able to demonstrate the scientific credibility which allowed a system that operated essentially by peer review to make that judgement. Mostly [we] would not invest in engineers and scientific researchers who [we] didn't think ultimately would be able to build income stream from the Research Councils.'

(Head of School, Top Six research HEI)

5.3.8 The evidence suggests it is more likely to be at the lower tiers that opportunities exist for QR funds to contribute to the creation of a virtuous circle of research. Fundamental to this process is that QR buys staff time, and provides researchers with the flexibility to apply for funding, not least because it supports their tenured posts. In this regard, it was notable that, increasingly, many Schools and Departments are trying to move towards a situation where academic staff who have not been active in research, particularly because of heavy teaching workloads, are able to create sufficient space to focus on research and bid for their own research funds.

5.3.9 This process is even more apparent in the less research-intensive HEIs that have successfully transformed themselves from purely teaching institutions in the 1990s and in the past decade have grown their research significantly. Their aspiration is to generate significantly more QR funding to enable them to become more research-intensive institutions. This creates conflicts as to how much staff time should be spent on research, particularly because a very high proportion of the income of such Schools comes from teaching and not research. The Head of School at a Medium research HEI explained the dilemma that this posed:

'We aspire to be in a position where the research income stream from QR, as well as from other sources, becomes a very significant part of our income stream. And if 50% of your income stream is coming from research, then you can justify 50% of your staff time being spent on research. In a place like [named Medium research HEI] at the moment, I can't justify 50% of my staff time being spent on research, because 80% of our income comes from the teaching side, and that creates tensions.'

(Head of School, Medium research HEI)

5.3.10 There is no doubt that there is a great desire at the lower tiers of the less research-intensive HEIs to extend the range of income generation. Research is seen as instrumental in that pursuit, and the structures which have been put in place are designed to deliver more RC and other non-QR research funding.

5.4 QR and attraction of charity funding

5.4.1 Charities and trusts fund a growing proportion of HEI research, particularly in the medical sciences. The biggest funders include the Wellcome Trust, Cancer Research

UK (CRUK), the British Heart Foundation (BHF), and Leukaemia Research. Medical research charities fund over one third of the UK's research in medical and health sciences (over £1.2 billion in 2012). Charitable funding of research is available across the spectrum of academic subjects, although it is of much greater significance in the sciences. As a consequence, HEIs that specialise in medical or selected scientific areas are relatively dependent on charities for research funding. The Top Six research HEIs in particular provide examples of a number of successful initiatives that have received significantly large amounts of funding from charities, such as Cancer Research UK, the Wellcome, and Guys and St Thomas's Trusts. There was near-unanimous acknowledgement from respondents that without charitable funding, it would be difficult to conduct research in many emerging areas of research.

5.4.2 Increasingly, there are very few research funding organisations that pay for 100% of research costs. HEIs increasingly have to use other funds including QR funds to meet any shortfall. Indeed, there would appear to be a growing reluctance for charities and other funding bodies to pay the cost of overheads and there is an expectation that such overheads will be covered from QR or other funds. This means that the more successful an HEI is in securing or winning projects from charities, the heavier their cost liability. Given the tendency for RCs to pay only 80% of the cost of projects, it implies an increasing use of QR to cover unmet costs. Nevertheless, many HEIs take the view that the role that QR plays in such circumstances is critical because it helps to keep strategic charity income in the UK. The PVC for Research at one Top Six research HEI remarked that the Wellcome Trust, for example, is perfectly free to spend its money outside the UK, and that if it was not being backed up by public money (QR) in this way, it would be that less easy for the trust to continue to support research in the UK. The significance of charitable funding was expressed in the candid views of the PVC for Research at another Top Six HEI as follows:

'I think it would be extraordinarily difficult for [named Top Six university] to continue without the volume of charitable research that we have, in particular because we have got such strong Medicine and Biology. It would be virtually impossible to continue with the size of that activity as it is if there weren't charity support QR funding or if the charities didn't take an alternative view to indirect costs. In that regard, I wouldn't necessarily say that QR has pushed us in that way, but if charity support QR funding were to be removed or were to diminish I could absolutely see a shift nationally out of bio-medicine, I can't see what else would happen or the charities would have to make up the difference.'

(PVC for Research, Top Six research HEI)

5.4.3 Given the growing requirement for HEIs to meet any funding shortfall of research costs, the introduction of substantial non-mainstream QR linked to charity income is seen as particularly important. The evidence suggests there is a high degree of mutuality between the HEIs that are significant beneficiaries and the charitable organisations. Thus, the PVC for Research at a Top Six research HEI acknowledged it would be very difficult for the institution to maintain its current levels of research activity supported by charitable funding if it did not have the QR charity support element. A striking example of the situation HEIs may confront is provided by a

specialist High research case study HEI, where UK charities now provide 25% of research grant income and non-UK charities another 28%. This means that over half of that HEI's income now emanates from charities. Unsurprisingly, there was evidence to suggest that charitable organisations have reciprocated positively to these developments by their readiness to invest in UK HEIs because they know that charity support QR funding is available to help meet the indirect costs of the projects they fund.

- 5.4.4 Notwithstanding these developments, few respondents reported that the introduction of QR linked to charity income affected their research strategy in a significant way. It is known that the allocations are drawn from a [finite] research income pot, to which all HEIs are allowed to submit bids for funding such that one HEI may benefit disproportionately. This, in turn, means that the HEI will attract a relatively high proportion of the QR linked to charity income. However, securing non-mainstream QR in this way is not guaranteed or sustainable year after year. For many HEIs this poses an issue, about whether non-mainstream QR actually is a reliable and sustainable source of income, simply because of the fact that it fluctuates. Indeed, the Director of Finance at one High research HEI noted that non-mainstream QR fluctuates by as much as 10% upwards and downwards every year. Consequently, with regard to the institution's own position on non-mainstream QR:

'I don't think we pursue particular charitable ventures because we think if we do this we will get more charity QR. Because actually what you don't know is what everybody else is doing. And so you could grow your charitable income by 10%, but if everybody else does the same thing, then nothing has changed.'

(Finance Director, High research HEI)

Attraction of charity funding at lower tiers

- 5.4.5 In contrast with RC funding, only a few of the lower tier organisations had close links to charities and attracted any charity funding. However, those that had developed close relationships with the major charitable organisations tended to be significant beneficiaries of research funding from that source. The benefits were likely to be significant where Schools or Departments have established what might be regarded as a critical mass of research expertise.

- 5.4.6 The most significant recipients of charitable funding at lower tiers were in either the Top Six research HEIs, or in the more specialist High research HEIs. Thus, the Head of School at a specialist High research HEI reported that they worked in the area of diseases of poverty within the developing world, which does not "attract big money from the private sector". Consequently:

'We rely very much on the charity based sector. It's not just UK charities like the Wellcome Trust, we also get a lot of money from the Gates Foundation; big money from the Gates Foundation and international charities. And so for us actually the QR is immensely important, because it supplements that gap.'

(Head of Faculty, High research HEI)

5.4.7 The Head of Department at a Top Six research HEI, similarly, defined how important charitable income was to the Department in terms of what would happen if it disappeared. He pointed out that charitable income is particularly important in his discipline which receives quite a large income from major research charities, such as Wellcome Trust and CRUK. Like other Schools and Departments that do not attract much direct FEC funding from Research Councils, the research income of this Department has a large charitable element. However, although the charities require bids for funds to include a calculation of what the FEC (including indirect costs) would be, they do not extend the funding to cover the indirect costs. This means that the Schools and Departments often face a major shortfall if they do not have the QR element to offset those costs. The dilemma this poses for lower tier organisations in this position, though, is that such research is also a major component of their output, both academic and in terms of their broader impact. As a result, QR has now become critical in attracting research funding from foundations and charitable organisations.

5.4.8 There is a debate as to whether, in times of financial constraints within HEIs, it is appropriate for Schools and Departments to bid to charities unwilling to fund overheads or the other indirect costs. However, there remains a strong imperative for Schools and Departments to seek opportunities to leverage other sources of research funding. Consequently, QR remains important in bringing flexibility into the system. This was the viewpoint of the Head of School at a High research HEI, who argued that to the extent that Schools and Departments seek to leverage some charity and industry funding, then the same rationale applies to the use of some QR funds to support the attraction of funding from those sources.

'In the current climate, writing those really competitive grant proposals requires good planning and good primary data, and often our QR would be used to position people to be very competitive in those competitions.'

(Head of Department, High research HEI)

5.4.9 For principal investigators (PIs), in particular, it is the availability of QR funding that often enables the development of on-going relationship with charities and, therefore, makes a significant difference in securing funding for their projects.

5.5 QR and attraction of business and industry funding

5.5.1 In contrast with the RCs and charitable organisations, the relationship between the case study HEIs and business and industry tended to be much more selective. Some HEIs did not attract much funding from industry, partly because of their discipline mix. For example, some do not have strength in engineering or medicine; or where they do, are involved more with teaching than research. Another reason relates to the HEIs' locations. A location in a medium sized town that has an extensive rural hinterland, but with no large industrial presence, is likely to influence the relationship an institution has with industry if it is not a major global or national research-intensive HEI.

- 5.5.2 The type of relationship that business and industry have with HEIs is also influenced by the type of support they seek. One important distinction is between a consultancy relationship and a long term collaborative research relationship to support mutually beneficial HEI research. This distinction is important, particularly in the way that it determines the scale and type of institutional resource required. Moreover the Higher Education Innovation Fund (HEIF) may contribute some resources in addition to any support from QR.⁴
- 5.5.3 Several of the case study HEIs used QR funding to leverage research funds from business and industry indirectly rather than directly. For the HEIs engaging with industry, the role of QR is typically to provide the research infrastructure and to support an overall research capability that is attractive to potential industrial collaborators. At one Medium research HEI, the availability of QR enabled targeted activities and initiatives in the specific areas of robotics, bio-fuels, creative technologies and the allied health professions. According to the PVC for Research this, in turn, has enabled the institution to say to industry, “we are good in [these] places, and this is how we use core research funding to accentuate that.” Thus, importantly, QR has been used as leverage for business sponsorship and funding.
- 5.5.4 The PVC for Research at a High research HEI noted that all the grants that are won from industry are underpinned by QR, which also provided the seed corn needed to establish a Rolls-Royce University Technology Centre
- ‘If I talk from personal experience I spent a lot of time in our Institute of Sound and Vibration Research and I’ve done an awful lot of work with industry over the years, and we’ve formed a Rolls-Royce University Technology Centre for example, and if I hadn’t have had the free time myself and amongst other members of staff to be able to do some basic research in the area of air acoustics, we would never have got Rolls-Royce’s money. So the existence of QR underpins that activity.’*
- (PVC for Research, High research HEI)
- 5.5.5 The approach to securing industry research funding by another High research HEI, is to identify areas where it believes it ought to be active, and then seek direct investment from industry to support research in these areas. In this example the case study HEI identified the new area of regenerative medicines, where it is now possible to treat the scarring of tissues so they recover their original function. A special centre for fibrosis has been set up in collaboration with a multi-national pharmaceutical organisation and a Top Six research HEI. The institution has invested strategically in new laboratories and new research staff partly from QR funds and partly from the pharmaceutical firm. According to the PVC:

⁴ HEIF funding is used to help HEIs develop and enhance their knowledge transfer performance. The funding can be used, for example, to support the infrastructure for, and capacity building in, enterprise education and projects. It can also be used to support employer engagement initiatives by helping to support the development of infrastructure within HEIs to enable them to engage with a wide range of business, public sector bodies and third sector partners. See HEFCE (2008), *Analysis of HEIF 4 Institutional Strategies: Overview Report*.

'It's an interesting example where the process there is, the academic community has identified an area that it thinks is new and novel and interesting, has been road-tested with the industrial collaborators, and a deal has been put together where the university invests and the company invests; and that then creates this new capability. That is the sort of thing that we try to do.'

(PVC for Research, High research HEI)

Attraction of business and industry funding at lower tiers

5.5.6 QR funding at the lower tiers has been used partly to build the intellectual capital and reputation that facilitates the leverage of funds from industry. Given the current difficult financial circumstances this is particularly significant for Schools and Departments in the most research-intensive HEIs. In this respect the role of QR is critical in enabling the recruitment of star researchers who are able to attract research funding from industry and other sources.

5.5.7 The Head of Department [Law] at one Top Six research HEI explained that the ambition of the Department is to not just attract a 'star' into the Department, but to also have students taught by "*someone who is pushing back the frontiers of ignorance*". To this end, the Department does not consider the availability of QR to be the end of any funding difficulties, but a means to go and find even more funding. Thus, the Department now has a policy of seeking extra funding for more senior posts, and has got Professorships funded by large international law firms, and there is a chair in English Private Law from another firm. The Head of Department here believes the core strength provided by QR to have been absolutely critical for being able to do this. In this case study QR funding was critical in enabling the Department secure £1.8 million in fixed term donations in funding for core posts, with significant benefits to both the funders and the Department.

'High quality training is of benefit to law firms and at the same time support is provided for an ongoing sustainable high quality Faculty.'

(Head of Department, Top Six research HEI)

5.5.8 The ambition is even greater at another High research HEI where QR funding has been used to leverage industry funding for the establishment of university technology centres (UTCs), the co-funding of projects with industry, the provision of equipment and the development of staff capabilities. The Head of Department summed up the role that QR funding has played in relation to the business and industry involvement.

'We've got two university technology centres, one with Rolls-Royce and one with Airbus. We've got the equivalent of one with Lloyds Register, one with Microsoft, one with Network Rail. I think the ability to be able to co-fund projects especially when you look at the FEC is incredibly useful and I think without the QR to do that, the attractiveness to industry to do some of those things would be very much less than it currently is.... QR funded research in the basic stuff in aircraft noise, air acoustics which has led to the basic UTCs with Rolls-Royce and Airbus; one of which is in engine noise and the other which is in aircraft noise generally.'

(Head of Department, High research HEI)

- 5.5.9 The same Department has successfully established collaborative projects in the maritime area, with Lloyds of London moving their engineers from London to the Marine Institute which Lloyds supports. The Department is also carrying out similar work [in Singapore] with a Singaporean Research Council. The Head of Department here had no doubt that it is their ability to provide that baseline of activity and excellence through QR over the years that has brought in that industry funding.

'The reason they are interested in working with us is by and large the well-funded lab, and the staff who have been developed through QR. QR brings in the initial expertise and then other funding kicks in.'

- 5.5.10 What emerges clearly from the evidence presented in this chapter is the extent to which QR acts as a spur to drive the generation of research income by HEIs from a wide range of funders. However, the benefits are not distributed evenly across the disciplines. Some areas do much better than others in attracting funding from different sources, often because they are specifically targeted for that purpose. Indeed, the setting of individual targets for different funding sources is being adopted increasingly, particularly in the emerging research active HEIs that are seeking to grow their research. This is part of the growing trend in a higher education sector where HEIs are keenly aware that they need to maximise their research income and research output, as this helps to drive up their reputation for quality and greater research activity and output. This raises an important issue concerning the extent to which the generation of research income is becoming the main focus of research in HEIs, particularly research-intensive HEIs.

'You have four or five years of data when your income, or what you've earned, ends up in the REF, and that's the sort of thing that is going to drive the volume measures in the REF, if it works in the same way as the RAE worked. So we do know that is important to us, and that we need to maximise our externally generated Research Council contracts because that will impact on our QR over time. But it's not a daily thought that goes 'if I do this, we're going to get more QR', because we don't know. It's all about what everybody else does, and about the changes in quality.'

(Director of Finance, High research HEI)

- 5.5.11 It is clear from the case study evidence that without QR, many HEIs could not begin to look at funding schemes that did not cover the FEC of the research. In the wider context of the relationship of QR to other funding streams, there is some anticipation among HEIs that there would be further reduction in QR funding after the REF (2014). Those that take this view consequently contend that it would be important for HEIs to

increase the level of external income generation in order to maintain the level of research income. This implies that HEIs need to work on those processes and activities concerned with external research bidding for securing funding in the years following the REF.

5.6 Conclusions

- 5.6.1 The evidence from the case studies suggests that HEIs now secure funding from a diversity of funding sources. In part this reflects a desire not to become too dependent on a narrow group of funders and ongoing financial pressures but it also reflects shifting requirements on the part of funders when providing funding support for research. Research Councils and charitable foundations often demand a contribution from HEIs when funding research.
- 5.6.2 QR funding plays an important role in attracting and leveraging funds from Research Councils and charitable foundations as it is often used to meet the matched funding requirements of these organisations when they make their awards. Without QR there would be the possibility of a serious funding shortfall. The funding gap associated with Research Council projects would need to be met from other institutional sources. In the absence of this, charitable foundations might switch their funding to research teams in other countries thereby potentially reducing HEI research in key areas such as the medical sciences.
- 5.6.3 The core research infrastructure and capabilities, supported in large part by QR and other research funding streams, facilitates and attracts research funding from industry, particularly major multinational companies committed to substantial R&D. This may involve specific funding grants or contract and collaborative research in which HEIs and industry work together in addressing research problems. Much of this business supported research is applied, but blue skies research is also undertaken.
- 5.6.4 The introduction of non-mainstream QR funding in respect of research funding secured from charitable foundations and industry makes an important contribution to the continuation of support from these sources.

6 What Is QR Spent On?

Panel 6.1 Key findings

- *QR funds a very diverse range of activities and initiatives in supporting the strategic research objectives of HEIs. These expenditures maintain and enhance the core research infrastructure, including researchers, equipment and the estate. They also enable and facilitate the restructuring of research to meet new and emerging societal challenges.*
- *A large proportion of QR funding contributes towards the salaries of researchers. QR is particularly important for the large research-intensive HEIs where it is substantial in relation to other income and deeply embedded in their financial structure. This limits the extent to which QR may be used to fund discretionary spending.*
- *QR is spent on raising research capacity and capability through new appointments of key staff including research leaders, providing attractive employment packages for 'star' researchers from other countries and nurturing and support for outstanding fledgling researchers.*
- *QR is used to support the restructuring of research and how it is organised across Schools and Departments. This may involve contributing to the setting up of Research Centres for inter-disciplinary research or supporting collaborative research with external organisations including other HEIs. Emerging and new areas of research also often find support from QR.*
- *Under-performing Departments are often supported by QR to help rebuild their research capability and address other problems.*
- *QR is used to buy out teaching time to enable academics to undertake research in disciplines where competitive research funding is difficult to secure.*
- *QR supports the building of strategic or contingency funds which many HEIs accumulate at the Centre and at the School or Department level.*

6.1 Introduction

- 6.1.1 Under the Dual Support system, HEFCE distributes around £1.6 billion in QR funding to HEIs every year. However, as QR funding is non-hypothecated, institutions have a high degree of autonomy in deciding how and for what purpose it is used. Moreover, the HEIs receiving QR are not required to account for how they spend that funding, although there is some expectation it will be used to support the core research infrastructure including staff and enable high quality research in keeping with their own mission. This chapter presents evidence on the use of QR funding in the case study HEIs. The focus is firstly on the intentions of QR funding, in its capacity as a non-hypothecated research funding stream that may be used in supporting core research infrastructure, equipment and new fields of enquiry. As indicated in the discussion on resource allocation, it is common practice for HEIs to set aside some part of QR funds either prior to allocation or after allocation through different mechanisms, e.g. taxation, claw-back, contribution etc. This 'top-slice' element of QR enhances institutions' flexibility in using the QR funding stream. Consequently, it is of interest to know whether, and to what extent HEIs are using different elements of QR funding for different purposes. The earlier discussion on resource allocation also explored the allocation of QR and the extent of top-slicing by Schools and

Departments, and it is important to document and understand their use of QR funding in meeting their research aims and supporting those of the HEI more generally.

6.1.2 It is important to reiterate our observation from earlier chapters of this report that in all the HEIs included in the study, QR is combined with a variety of other income flows, and the total is then spent by the HEI, Schools and Departments. In these circumstances, QR may be seen as making a pro-rata contribution to those expenditures.

6.1.3 It is already clear from the earlier chapters that HEIs use QR funding to support a wide and diverse range of research activities. These expenditures relate not only to the funding of the existing core research infrastructure underpinning research in the institution, but also to a wide variety of initiatives required to secure the intermediate objectives of the research strategy. The outcome is a process of restructuring and renewal of the research infrastructure, in response to shifting research priorities and changing internal and external pressures. This restructuring may take place at the Centre (the HEI), in Schools and in Departments. In this context, it is possible to cluster QR spending under three broad areas of expenditure:

- Spending to support the core research infrastructure
- Spending to support restructuring (of the research base)
- Spending to support building of strategic funds

6.2 QR spending in support of the core research infrastructure

6.2.1 QR plays a vital role in supporting the core research infrastructure in all the institutions investigated in this study. This is not least because a greater proportion of QR is used to support staff salaries, in one way or another. This is particularly important for the research-led Top Six and the High research HEIs. Inevitably, much of this expenditure is on academic staff salaries, but also includes new equipment and charges for the use of premises of different kinds. Among the research-led Top Six HEIs, in particular, much of this type of expenditure appears to be pre-determined by the structural costs that must be met. However, whilst in some regards QR funding may be seen as just one source of overall HEI income for paying salaries, that role must, at the same time, be considered in the wider context of the contribution QR funding makes towards supporting the research base of the entire institution. The evidence from respondents at different institutions provided valuable insights into the varied ways in which that support operates at the different tiers of the HEIs.

6.2.2 Human capital is at the heart of research in HEIs and, consequently, a high proportion of their QR allocation is spent on those who do the research, as well as support staff. Some staff are tenured and some are contract staff working on specific projects. The Head of Resource Allocation at a Top Six HEI emphasised the important contribution of QR in underpinning the wider research infrastructure by the fact that QR funding is often paying for the time of academic research staff that is not reclaimed on research grants. In this regard, there are some important discipline-specific effects, notably in the Arts and Humanities, where typically a relatively high

proportion of academic salaries is supported from QR funds compared with the situation in science and technology Schools and Departments.

6.2.3 QR enables discretionary spending that helps to secure a range of initiatives designed to strengthen the core research infrastructure. One of the significant ways in which QR funding is used in this regard is the recruitment and retention of high quality staff, with the capability and experience required to strengthen existing areas of research activity but, as well, to support and enable the opening of new areas of research. At one HEI, for example, QR funded a part-time Fellowship for a world-famous musician. The PVC for Research noted that for a relatively small amount of money a year for a three-year appointment, the Fellow has made a significant contribution to the REF.

6.2.4 The importance of using QR to support the core infrastructure is emphasised by the Head of School of a Top Six HEI:

'I invest in the base capability so then I can go to the Research Councils and secure funding. For example, I might make a judgement that I decide to renew my Chemical Engineering Department. I decide to get somebody with a new set of skills who might open up a new area in chemical engineering and now that person has secured significant EPSRC funding. That was an investment choice to do that and then that person was able to demonstrate the scientific credibility which allowed a system that operated essentially by peer review to make that judgement. So, you need strategy and entrepreneurialism. Mostly I would not invest in engineers and scientific researchers who I didn't think ultimately would be able to build income stream from the Research Councils.'

6.2.5 Similarly, a specialist High research HEI has, over the last few years, been able to attract some high flying staff including a Deputy Director from a Singaporean university and an academic member of a University of Oxford research group:

'So we actually use the [QR] money partly to support them and to try and attract high level research scientists who fit our mission. That has helped support the quality and quantity of research here because we have to go for the top level research and we have to have the best people. This has contributed to more papers and publications... and increased our global reputation and not just our UK based reputation because I think that's where our other challenge is.'

6.2.6 Among the research-led and research-intensive HEIs in particular, the ability to attract 'star' researchers requires new state-of-the-art physical space and amenities as part of the 'appointment package'. Thus, for example, at one Top Six research HEI:

'Anyway, for example, we're just building now a Mathematical Institute, a £70m building and it's a key part of our development. So, part of the funding for that is through QR, and I think without QR, though it probably would still have taken place, the scale and scope of it would have been much different. Why is that important? We have hired, for example, a senior academic from Princeton.... Had we not been able to provide adequate space and an appropriate

environment then probably he wouldn't have come. So, if you want to get real leaders with very high visibility there you've got to do it.'
(PVC for Research, Top Six HEI)

- 6.2.7 The Head of School at another Top Six research HEI, cited the recruitment of two star professors who “had changed the direction of research in their respective areas”:

'These are people with very, very high established reputations, they expect an institution into which they are moving to provide some of the wherewithal to establish their leadership across the world and within the university in their area, and that tends to be the first call on what limited discretionary funding [QR] we have.'

- 6.2.8 One High research HEI has made a major strategic investment to fund what they call ‘Leadership Chairs’. The investment is partly funded from ‘top-slicing’ QR by the Centre. The HEI has invested in up to 35 such Leadership Chairs and the aim is to recruit top academics to lead new areas of research and to develop them rapidly for both research and teaching purposes. The establishment of the Leadership Chairs has been partly driven by the REF but the PVC for Research has no doubt that this investment in human capital is entirely congruent with the HEI’s strategy to increase its international impact and research reputation.

- 6.2.9 A School at another High research HEI was able to recruit one of the foremost academics in a specific field, who arrived with a full complement of experienced research staff. The HEI itself provided and equipped a top class laboratory, again with support from QR funding, to provide the necessary accommodation because of confidence in that research area.

- 6.2.10 Equally as important as attracting established ‘star’ researchers is investment in career researchers. A High research HEI has established a University Fellows scheme, which provides five-year research fellowships to early career academics, with a permanent job at the end of the fellowship period. The HEI, through a central fund that is supported almost entirely from QR funding, pays for the fellowship during the five year period, after which it falls on Schools to absorb the costs and make sure it is sustainable. The HEI in this case has appointed more than 60 such University Fellows since the scheme was established some three years ago.

- 6.2.11 QR also provides funding for research studentships. This allows continuity of research at post-doctoral level and provides principal investigators (PIs), in particular, with potential new collaborators in new areas of research. The funding of both doctoral and post-doctoral researchers in this way is particularly noticeable in the Medium research HEIs that have recently become research-active and are seeking to build capacity in particular disciplines. The Head of School at one such HEI highlighted the importance of QR funding in contributing to that process:

'The QR budget goes on research students, research fellows and salaries. Firstly, research fellows are people with four years' post-doctoral experience, who have made the progression to independent researchers.... Secondly, research studentships [in this field] are coming out of the QR component that is set aside for [this field]. I sit down with the finance guy every so often and we decide how many

of these we can afford. When we have new members of staff coming in we tend to prioritise the allocation of students to them. So, for instance, if we've got an overseas student who is not eligible for STFC [UK] funding then this provides the means of supporting this studentship to those new members of staff. This is a very important part of the flexibility locally in order to make sure the whole thing remains in a decent state of health. In effect the QR money does help pump new projects through the studentships, fellowships and new hires.'

(Head of School, Medium research HEI)

6.2.12 Thus, the development of post-graduate research students and doctoral programmes is seen as a very important part of the research agenda of the HEIs that have allocated quite significant amounts of QR money for that purpose. For the research-active institutions, in particular, an important objective in investing in the core infrastructure in this way is to improve their profile beyond the (traditional) league table of HEIs. High-end research is clearly instrumental in putting such HEIs in a more advantageous position, and the research infrastructure which they put in place through such investment is clearly designed to extend the range of research and deliver more grant-related research funding, especially Research Council funding.

6.2.13 An essential aspect of maintaining research capability is the ability of researchers to spend time on research. It is estimated that an academic in a typical science School at one of the research-led HEIs, devotes about 20% of their time to teaching but most of the rest of their time to research. It is also acknowledged that the amount of time researchers spend on *funded* research is appreciably less than the amount of time they spend on research in general. This suggests that much of the time spent on non-funded research is supported by QR funds.⁵ By contrast, academics at less research-intensive HEIs spend a much higher proportion of their time teaching than researching. At these institutions, too, the availability of QR funding underpins the adoption of new workload models aimed at increasing the time spent on research. In this case QR funding may be used to make an adjustment, or 'buy out' the time spent teaching. In the case of the HEIs seeking to make the leap and intensify their research capability, QR enables them to make this shift. But, as the Head of School (Humanities) at one such Medium research HEI put it:

'Our 4 academics are 4* academics because they have the space to think through and develop projects and indeed, what they will tell you, is that they have the space to do things which are not productive. I have got quite a lot of creative practice-based researchers at this School and they will say that it is not just about design, it is about trial and error – you cannot simply programme outcomes from the work that they are doing. So, I do think there are connections between capacity and quality which we cannot avoid and constriction would have a real impact on both.'*

(Head of School, Medium research HEI)

6.2.14 The 'buying out' of teaching time has become one of the important uses of QR, but is increasingly also defining how Schools and Departments are perceived within HEIs.

⁵ Interview with Head of School at a Top Six research HEI.

'What would distinguish, say, a research led QR funded English Department from one that would not be, would be the number of contact hours in terms of teaching. So, in effect, the major thing that QR does for us is allow us to have staffing levels to enable us to have lower levels of teaching contact to enable time to be devoted to research. So time is the big element.'

(Head of School, High research HEI)

6.2.15 The releasing of time has important discipline-specific effects, particularly for the Arts and Humanities, where almost three-quarters (70%) of research income comes from QR funding. More generally, subjects that are not project-based or time-limited cannot be easily funded by other means, so they rely on non-hypothecated funding such as QR. A Head of School at a High research HEI suggested that the largest difference between an arts and a science model is that science needs QR funding to enable it to equip laboratories and to run experiments and without such funding could not do research; whereas in English, for example, QR enables Schools in the Arts and Humanities to produce a greater volume and quality of research. If they did not have QR they would not stop doing research, but would just do less of it.

6.2.16 The PVC at another High research HEI summarised the importance of increasing the time available for research and its dissemination by changing the balance between research, teaching and administration:

'I think one of the great things about UK universities has been that discretionary time that enables you to build things for the future, that enables people some thinking time where they're not just trying to deliver something against a grant and where they're not having to teach all these students. Precious free-thinking time is really what the QR funds in this institution, as well as a lot of other bits and pieces. Fundamentally it is used to fund academic staff to do what they do best.'

(PVC for Research, High research HEI)

6.2.17 Principal investigators (PIs), in particular, regard QR as critical for planning of research activities because it is a stable and consistent source of funding that provides flexibility and 'free space' to undertake research in new areas, or work on research projects that take existing thinking forward. The role of QR in generating new ideas cannot be underestimated, and has particular implications for the global reputation of the UK higher education sector.

'If you're always responding to what other people's agendas are then what it means is that effectively British academics are falling behind global agendas, because instead of setting global agendas they'll be responding to them.... [QR] funding in the arts [for example] doesn't mean that you're just funding cultural stuff. You are also funding the things that change how we think about what human beings are, and that actually has a massive impact on policy and practice. And that is why in some of those areas we [the UK] are still world-leading, despite the fact that we are not competing with America in a lot of other ways. In some of those innovative ideas, we do still have world leading academics.'

(Principal Investigator, High research HEI)

- 6.2.18 Those views were echoed by a PI at another High research HEI, who suggested that QR has a disproportionate influence on the overall quality of UK research through its contribution to creating an environment that enables researchers to do fundamental work.

'It is what you would call curiosity based research, which was at the basis of the British educational system until fairly recently, that we will see what is over the next hill. If you have this kind of system, then universities can do that. If one has an entirely hypothecated system, you do what the system requires, and there is much less flexibility.'

(Principal Investigator, High research HEI)

The respondent PI cited above also had no doubts that it would be impossible to finish a book project, for instance, without the benefit of a sabbatical; and was equally unequivocal that if QR funding stops, then (academic) sabbaticals also stop.

'That means books stop being written. You can still do journal articles, but books become very difficult. You can do some journal articles, and you can do some preparatory work. But unless you get a sustained period of time, you can't write a book.... That is the fundamental thing that a sabbatical gives that no other time gives.... When you know you have a sabbatical coming up, it reduces your worry about producing those outputs. QR is what turns us from being journalists and teachers into being scholars that have any potential to take a world lead in our fields.'

- 6.2.19 Lastly, another respondent at a Medium research HEI indicated how, more pertinently for PIs, QR funds support their research by creating the 'free space' where research can happen.

'In fact the more teaching you do, that squeezes the space for research. What is fairly normal for most people is that you need a sustained space to get your head right. It will take you a while to immerse yourself in new material to put together, and if you can only grab a couple of hours here and there each day or each week, you just don't get anywhere. So, yes, buying you out of teaching and whatever other duties, gives you that space. It is invaluable.'

(Principal Investigator, Medium research HEI)

6.3 QR spending to support restructuring (of the research base)

- 6.3.1 A particularly strong view held by a number of respondents in the research-led and research-intensive case study HEIs is that the non-hypothecation of QR has become a critical feature of the management of research, enabling them to act strategically and develop new research areas or revive dormant or underperforming areas. In this way, QR funding is seen to support quite often fundamental structural change in the HEI research agenda in support of long term strategic objectives.

- 6.3.2 For a number of case study HEIs, such restructuring increasingly involves a shift towards inter-disciplinary research. It is expensive to set up inter-disciplinary research from scratch but there is evidence from the case studies to indicate that QR is making an important contribution in this respect and oiling the wheels to enable a new and unusual intersection of research interest. In the less research-intensive institutions this often occurs around a narrow range of research disciplines. The more research-led and research-intensive institutions, by contrast, tend to seek advantage across the board, i.e. across a broader range of disciplines. It is notable that a PVC for Research at a High research HEI drew a parallel between inter-disciplinary research and the perceived advantage that the very successful research-led, substantially endowed HEIs enjoy in both the UK and the US. The viewpoint of the Head of School at a High research HEI is illustrative:

'[What] QR gives us is that ability to operate in the zones where the Research Councils and the direct funding are not covering. So we clearly have a good portfolio of research income to fund projects. But it is taking that activity and growing that, and being able to mesh that into different activities and to start new things as a result of that; so, to pump-prime new activities, particularly inter-disciplinarity, I think is really key. We do think that is the way to do it, but the funding of that is fairly tight, and QR gives us much more flexibility in that whole operation. It is really essential for what we do for our competitiveness.'

(Head of School, High research HEI)

- 6.3.3 An example of an inter-disciplinary initiative is provided by a High research HEI that set up a Transformation Fund drawing on a Strategic Fund incorporating QR. There are nine Transformation Fund projects, in broad areas such as energy, water and biomedical health. An inter-disciplinary team is responsible for each of the transformation areas including professors and post-doctoral Research Fellows. The initiative aims to secure world-class status for the HEI.
- 6.3.4 Another High research HEI has made use of QR income in this way to create an inter-disciplinary social science and biological science group that aims to exploit a major bio-social database. The initiative builds on research interests across social and economic research, biological sciences, psychology, and health and human sciences. In order to support this major initiative, the HEI has made a significant investment in research staff, including the appointment of new professors to lead the research.
- 6.3.5 The flexibility that QR accords has been used by one Top Six research HEI to initiate structural change by investing in Departments deemed to be underperforming, either because they were too small or did not have the range and types of skills that were needed. The Departments benefit from lower contribution targets than hitherto and investments have been made in staff and research facilities.

'Pretty much everything we've done in the core engineering and science areas has been enabled by the fact that they are able to attract strong QR. Non-hypothecation of QR is certainly a critical feature of my management as I am able to act strategically and

develop areas where we are underperforming. (The QR allows me the flexibility I need – we've set up new Departments, we've opened up new research areas, we've invested in research facilities. This would have been pretty much impossible if we were only getting money from Research Councils).'

I have two areas which I identified fairly early on in my tenure as dean as areas that I should focus on. They are vastly important subjects at the centre of issues of sustainability, energy, and manufacturing – all sorts of things like that. [One area] was too small and was marginally underperforming. [The other] was I think underperforming and didn't have the range and types of skills I felt were needed. So I am directing investment into those two Departments. They have lower contribution targets than hitherto and they have a program of staff and facilities investment which we have developed over the next three years which will deliver them to the right point. QR is critical in that process. Of course I do all of the sensible things like front-loading staff investment to ensure that those people earn above a necessary amount.'

(Head of School, Top Six HEI)

Establishing Research Centres

- 6.3.6 QR funding is being used to establish small-scale, new Research Centres to facilitate inter-disciplinary research and coalesce researchers under a common theme.
- 6.3.7 A Medium research HEI, with research strengths in the Arts and Media, used QR funding to support a newly established Arts Centre in Pedagogical Research that excels in inter-disciplinary research, drawing together researchers from different disciplines to work and publish together. The new centre has been able to secure external funding which has enabled the development of a critical mass of research capability in this area of research.
- 6.3.8 Another notable example is in the case of Medium research HEI which has made a conscious decision to use QR funding only to support its three research institutes.

'We have three research institutes (since 2003) which are not specific to a particular area, but encompass a broad series of cognitive areas. This provides an infrastructure for research in a non-research-led environment. Today, all research sits within a research institute. So, we have the Science and Technology Research Institute, encompassing engineering, physics, computer science etc., the Health and Human Sciences Research Institute, encompassing health sciences, nursing, psychology etc., and the Social Sciences, Arts and Humanities Research Institute (SSAHR).

(PVC for Research, Medium research HEI)

High risk research

- 6.3.9 The non-hypothecation of QR makes it a particularly suitable source of funding for high risk curiosity-driven fundamental research. However for many of the case study HEIs the use of QR in this way was not perceived as a central goal, although it was recognised that QR makes a major contribution in funding research active staff, particularly in the Top Six and other research-intensive HEIs. For the most part, HEIs

were reluctant to make a distinction between high risk fundamental ('blue skies') and applied research in the use of QR. While some expressed a desire to see researchers who were interested in doing novel and original thinking, they were also concerned to drive this through to practice. The view of the Head of School at a Top Six research HEI was, for example, that great fundamental research is informed by the demands in practice, because it is new classes of problem that lead to that sort of thinking.

- 6.3.10 Nevertheless, this must not be interpreted to preclude the desire of some institutions to be considered as world-leading in setting the agenda for future research, which clearly means having a significant portion of their research activity very much oriented towards the future. The views expressed by a range of respondents are instructive in this regard. From the PVC for Research at a Top Six research HEI:

'As an institution our notion isn't of course to be world leading in the quality of our research, but world leading in setting the agenda for future research. That clearly means that we would need to have some portion of our research activity that is very future orientated. Of course all of it is in the sense that it is new discovery and new application, but thinking about questions that are necessarily going to be even more risky but hopefully transformative. That probably means we're not in the position at the moment where Research Council funding is likely to be available and, therefore, it is important to be able to support that sort of activity and QR clearly plays an important role in that.'

- 6.3.11 And from a PI at a High research HEI:

'You need to explore things, and one of the things that the funding councils talk a lot about is making sure that they have the next portfolio, so they have some high risk work. And you need to be able to take risks. If you're only doing things which you conservatively know will work, it is very difficult to explore the ideas of something that you have a feeling would work. You've got to have the space that you can explore the slightly riskier, more ambitious, and more imaginative ideas, where you do not have to deliver against milestones. You've got to have space to do some of the more imaginative stuff.'

- 6.3.12 And the Director of Finance at a High research HEI:

'QR is contributing to the outputs of our high quality researchers, such as our University Fellows, and funding new research ideas and thoughts; and things that actually we can't attract external funding for because they are not well formulated enough in the mind to go to a sponsor and ask, 'would you like to fund this?' You have to do that preliminary thinking – blue skies research - before you make a bid to a Research Council or a charity that has an interest in what you are doing.'

6.4 QR spending to support building of strategic funds

- 6.4.1 QR makes an important contribution towards the accumulation of strategic reserve funds and other contingency funds. In many of the case study HEIs it is the 'top-

slicing' of QR that contributes to the building of strategic funds, particularly as such funds are deemed discretionary. While the accumulation of strategic funds occurs in Schools and Departments, it is funds accumulated by the Centre that are often of a scale to effect the more significant impacts in pursuit of the overall aims and objectives of the research strategy.

6.4.2 These strategic funds are used for a wide range of purposes including driving major new initiatives; pump-priming for projects; creating and supporting Research Centres and institutes; providing reserves for adjusting Departmental financial flows; for matching grants with Research Councils; and to establish start-up packages to attract new professors.

6.4.3 A High research HEI provides a comprehensive example of the contribution that QR funding makes towards a strategic fund and its subsequent deployment. The HEI top-slices QR funds prior to allocation to its Schools and Departments. The strategic fund is used for three specific purposes.

The first is investment in the physical infrastructure for research. Like many HEIs in the UK, the institution has invested heavily in its estates, but in recent years has placed much greater emphasis on the research estate, with major refurbishment of many of the facilities in Engineering, and Biological and Medical Sciences. More pertinently, the HEI is in the process of setting up a new Institute of Translational Medicine in collaboration with a local Hospital Trust. The initiative is funded jointly by BIS, the local NHS Trust and the HEI using QR funds.

Secondly, the HEI invests heavily in research capital infrastructure. For this, the institution has established an equipment fund which is held centrally under the control of a committee which oversees (internal) bids for equipment that typically costs around £0.5 million. The HEI has undertaken to provide matched funding (from the equipment fund) for equipment for which the Research Councils only meet half the costs.

The third way in which the HEI uses the strategic fund is to pump-prime new initiatives in Schools and Departments by providing initial funding for periods of between one and five years, after which the costs will have to be absorbed by local budgets.

6.4.4 Schools and Departments also establish strategic funds for significant purposes, as in the case of a School at a High research HEI.

'We take now something like £150,000 we took out of this Faculty level to fund pump-prime initiatives. We spend it on conference fund, on research project priming. We're funding what I call research clusters, so I said we've got this business of getting people together to talk about research, giving small amounts of money, networking across the Faculty and across the university to get small projects going. Research Centres, we've got a centre for medieval studies, study for classical civilisation, this kind of thing, they get money.'

(Head of School, High research HEI)

6.4.5 For the most part, though, the QR funds coming to lower tier organisations were often quite small sums of money at any one time. However, there were instances where Departments, for example, could build these up by combining them with other

external grant funding, to a scale that could be used for strategic purposes, such as refurbishment of laboratories, or paying for the time of people caught between grants.

6.5 QR spending to secure intermediate objectives

6.5.1 Although a substantial proportion of QR is used to fund the core research infrastructure, discretionary spending is often enabled by contingency funds, supported from the QR income received by either the Centre or the Schools and Departments. Within the main goals of QR spending described in the preceding sections, however, it was also possible to identify other spending on an array of initiatives and activities, designed to secure a range of intermediate objectives, aimed at propelling the lower tier organisations, in particular, towards their overall research aims and objectives. We have listed the main activities and provided quotes from the relevant interviews to describe them in some detail.

Strengthening teaching

6.5.2 QR funding helps in building the research quality which leads to higher teaching quality and also provides role models for students, in the form of high profile academics who are doing high impact research that is also influencing their teaching too. For example, at one specialist HEI, a professor who is funded from QR has been doing work under the rubric of textiles, environment and design, and set up a group to build up their research by encoding the teaching process to find out what in it was sustainable and what was not. On that basis, the group proposed a manifesto of principles of sustainable design, which they are promoting to corporations and government. The Head of School opined that the QR funding has enabled the group to integrate research and teaching and, subsequently, to generate new projects.

'We're not the sciences, so we don't have people with £1m grants. A lot of what we do is based on QR and QR is how we build research quality. There is no other means, because QR is what allows us to demonstrate research quality in the fields of practice in which we are all engaged. As an example, one of our professors did a project on entomology with the Natural History Museum, which involved him working in the jungles with an entomologist and doing these very large scale paintings of insects. If the same person is teaching on a painting programme at our College, he is building quality because the students see him as someone who is not simply going off into a studio and painting, but engaging with debates, engaging with an intellectual field which is quite challenging, and coming off rather well. So, that's one way in which a display about displays enables students to get involved in seeing what research means in an Arts School context. It's about role models, it's about saying 'look I'm over here, wouldn't you like to be here too?'

(Dean of Research, Specialist HEI)

6.5.3 That was the also the viewpoint of the Head of School at a High research HEI, in the broader context of the impact of how research informs public policy and teaching.

'I think also what QR does is to direct funds to bodies of researchers who have got proven track records, who've got expertise, and who

tend to have significant volume. We're not kind of talking about one or two people working in isolation, but we're actually talking about communities where people value research and talk about research, and where research is an important thing. But I do think also that the fact that we have elements of freedom around QR means we can choose projects where we think we're going to be most effective, both intellectually and in terms of policy and impact. But also, that research feeds into the teaching that we do, so there is a knock-on effect of using QR in that way, in terms of the teaching quality and what we can give our students.'

(Head of School, High research HEI)

- 6.5.4 What is particularly important here is the relationship between research and instruction, and where there is great potential to change people's worldview. Indeed, in the more research-intensive HEIs, all models of teaching begin with research, so that all teaching has a research element; which implies that institutions cannot deliver their philosophy of education without research. And whilst there are various streams of funding which allow academics to carry out research, it is the internal, non-hypothecated QR funded research that is seen as most integral to the teaching.

Writing grant applications

- 6.5.5 QR funding also helps academics take time off from their teaching and administrative tasks in order to write grant proposals for further funding; or writing research based outputs that would help not only in furthering basic research, but also with winning further grants. This is particularly important in situations where the grants or contracts supporting the research do not stretch sufficiently to cover the costs at write-up stage. In most institutions it is possible for people to use time that is funded by QR to finish off writing up research based outputs that also add to the knowledge base.

'Both the bidding for and writing up of research is a very common use of QR time. With some funders you can write in your bids, and one of the outcomes from the funder's point of view is that you will write an output, but some funders aren't interested in that. The Research Councils vary much are, but government Departments and charities vary.'

(PVC for Research, High research HEI)

'These days if you get a Research Council grant you've got to demonstrate readiness in a certain area, so having that (QR) money to free up staff to do that is very important. All our grant winning is underpinned by QR.'

(PVC for Research, High research HEI)

Funding the FEC shortfall

- 6.5.6 QR funding is also used extensively across many HEIs to meet the shortfall in the cost of projects funded by research councils and charities.

'What QR is used for is it is definitely used to cover the deficit from funded research, and without that we would not be solvent as a university, and we would have Faculties and Schools that were insolvent as well.'

(PVC for Research, High research HEI)

'There are indirect costs of research and QR will meet some of those. On a research grant by the time you have met 100% of the direct costs from it, you are only left with 80% of FEC, overall you are only meeting about 60% of your indirect costs so in other words 40% of the share of the electricity bill which is attributable to research must be paid from QR, because under the FEC system there is nowhere else to pay for that from.'

(Head of Resource Allocation, Top Six research HEI)

- 6.5.7 A successful example of where QR funding has helped meet the FEC of applied research is in case of a Medium research HEI, where the money has supported strengthening of capacity and capability for effective translation of research in relation to a rare disease. In this case, the PI of the project has worked with charities based in the UK and US on research that involves the medicine currently in use for treatment, which works, but has severe side-effects. The research has involved attempts to improve the medication, and is at a stage where there are trials to see if it works on mammals. In this example, QR funds have supported the research through the design and testing stages. QR is continuing to support the project, as the charity involved is paying for the post-doctoral fellow to move to the next stages of the research. But the FEC is supported from QR funds.

Capital investment: equipment and estates

- 6.5.8 QR funding has also enabled improvement and enhancement of the research environment through investment in and maintenance of high quality buildings, state of the art equipment and supporting research facilities.

'I don't think that anyone would doubt that we're the leading nuclear university, for example, for our work on nuclear [research] through our [name] Centre. That involved a series of very substantial investments of the university's own resources – £10 million initially to become operators of the nuclear lab, and building our [location] facilities. That is a good example of where QR gave us the capability to do it.'

(Vice President for Research and Innovation, Top Six research HEI)

- 6.5.9 In case of a Department at one High research HEI, surpluses generated from QR funding may be used for buying sets of equipment which are commonly used by staff and research students. The maintenance, upkeep, calibration and operation of that equipment are also covered partially by QR funding. Similarly, when the Department recruits new members of staff, they may be provided with specific equipment from a QR-supported research funding pot as well. In some cases, the School may spend up to about £10,000 of such research funds for the purchase of start-up equipment to support new staff in this way. Another way that QR is used is that if there is a surplus on the accounts at the end of the year, then the Department may use this to purchase new or replacement equipment.

Knowledge exchange and translation

- 6.5.10 In many research-led and high research HEIs, QR has also been used to improve the organisation and management of research through establishment of Research and Enterprise or Knowledge Management offices.
- 6.5.11 In the case of one Top Six research HEI, the role of the Knowledge Exchange Office is to provide support for projects that involve either inter-disciplinary activity, or new ventures, or seed corn activities and, where, typically, the value of non-hypothecated funding is most obvious. In practice, the office anticipates the scope for hypothecated funding in the year ahead. In this regard, the office has a role in both identifying possible sources of funding and also positioning, and shaping the capability of the HEI in such a way that it is close to the market call, i.e. to the demands of external funders. According to the Director of Research and Business Engagement, the job of the Knowledge Exchange Office would be significantly different if all research funding was essentially through the grants and contracts mechanism. Under those circumstances, the HEI would be permanently engaged in trying to bridge the gap between the different funding streams. However, QR provides the ability to plan, and to run activities side-by-side; for example, do certain things in good times and certain things in the lean times, and have a resource base.
- 6.5.12 In some cases, QR funds are used for research activities that do not necessarily contribute to the generation of future research funding; for example, local outreach activities, civic engagement etc. QR helps to subsidise some of the engagements that Schools could not otherwise do. At a High research HEI, for example, the Head of School has recently written a report on what Departments are doing in relation to the location of the HEI in what is regarded as a 'super diverse' city, but as well within the context of the history of the extended region. Thus, there are activities about civic engagement, such as running local history programmes, talks to local history associations etc. The QR funding available frees up staff time to participate in such activities, and for other engagement with museums and galleries and other local heritage institutions.
- 6.5.13 The picture that emerges clearly from the evidence is the diversity of initiatives on which QR funding is spent by the institutions in this study. The evidence further reflects the diverse circumstances and the strengths of the institutions. There is also clear evidence of novelty, in the extent of experimentation in the way QR is used to strengthen their research strategies. Both the diversity and novelty aspects of their spending of QR are a reflection of the non-hypothecated research funding flow. In particular, the notion of diversity and the tailoring of QR to their circumstances mean that it can also be customised to fit their strategy. This, again, is a strength of the non-hypothecated nature of QR.
- 6.5.14 It is also clear from the evidence that some of the initiatives listed and described are institution-wide initiatives, and some are at School level. Some, however, are specifically at the Department and PI levels. Our observation here indicates that there is a high level of subsidiarity, particularly at the lower tiers of institutions. This is an

indicator of the efficiency and effectiveness of QR funding, in the sense that the funds are being deployed to the areas where they are most efficiently used.

6.6 Conclusions

- 6.6.1 QR supports a diverse range of research activities and initiatives. Of central importance is the financial support it provides in maintaining and enhancing the core, or bedrock research infrastructure particularly in the major research-intensive HEIs but also more widely across the HE sector. This includes meeting academic staff salaries not funded from other sources such as Research Councils and charitable foundations, contributing to the maintenance and purchase of new equipment and major new strategic initiatives involving 'state of the art' physical space and equipment.
- 6.6.2 QR is playing an important role in the restructuring of research in HEIs in a number of ways. In its support for interdisciplinary research it provides funds for the establishment of Research Centres, for supporting collaborative research with other HEIs and for appointing research leaders in new and emerging areas of research. HEIs are spending QR in novel and diverse ways which reflect their circumstances and are tailoring its use to support their specific strategic research aims and objectives. In this respect the non-hypothecation of QR is seen as a real benefit by HEIs.

7 Outputs, Benefits and Impacts from QR Funding

Panel 7.1 Key findings

- *The outputs of QR funding include the quantity and quality of new knowledge, research capacity and capability, the quality of teaching and training, and the diffusion of knowledge.*
- *Different types of knowledge are linked to QR funding either directly or indirectly and include potentially valuable curiosity and 'blue skies' knowledge and applied or user inspired knowledge of more immediate interest and benefit to society. These outputs are reported in academic publications but may also become accessible through a wide variety of knowledge diffusion mechanisms.*
- *Research capacity and capability building are key outputs of QR funding and differ widely across HEIs, reflecting their different spending priorities and strategic aims and objectives.*
- *QR funding has also resulted in improved management and monitoring of research.*
- *Research supported by QR has in a number of HEIs, particularly in the Arts, strengthened and informed teaching and instruction of both undergraduates and post-graduates.*
- *Impacts and benefits accrue to the HEI and its academic staff through reputational benefits, new opportunities and improved career trajectories.*
- *Wider economic benefits are reported by case study respondents. These accrue to external organisations and are supported by HEI Knowledge Exchange Offices. Further evidence on beneficial impacts is indicated in the results from the econometric analysis.*

7.1 Introduction

7.1.1 This chapter focuses on the outputs and benefits of QR funding. These are not easy to identify owing to the difficulty of attributing specific outputs and benefits to QR funding inputs, and this problem is compounded in that QR funding is very frequently combined with other funding sources. Other factors may also enhance or reduce outputs and benefits associated with a QR investment making it very difficult to disentangle those that might legitimately be attributed to QR funding.

7.1.2 The case studies revealed some particular examples of projects and investments where the effects of QR could be more easily isolated. For example, when only QR funding is used for the purchase of a specific piece of equipment, in which case the outputs associated with the use of that equipment can be attributed to QR funding. Such a scenario was presented by a School of Engineering at a Medium research HEI that had decided to spend all of its QR funds in a particular year to purchase an atomic force microscope. This then became a single investment spending on a facility, in which case everything that derives from that piece of equipment could legitimately be attributable to the QR spending. In cases such as this there may still be a question as to the counterfactual in that some outputs and benefits might have been secured if the QR funded investment had not been made.

7.1.3 Notwithstanding these problems, one PVC for Research at a Top Six research HEI suggested that there are circumstances where it is quite easy to identify the outputs from QR because it is the dominant funding stream for research in some disciplines. In particular, in the Arts and Humanities, where only a small proportion of academic staff have significant research grants, then it is possible to attribute almost all of the research activity to QR because nobody else is paying for it.

7.1.4 Given these difficult issues, it is perhaps more appropriate to look at ‘softer’ evidence, such as the desirable aspects of QR that have enabled institutions to invest in the areas they regard as their strategic priorities. Many of the institutions in this study identify areas where there is a strategic need, and then using QR funding as an investment resource. In these circumstances, it is perhaps not uncharitable to suggest that many of the HEIs considered the outputs and benefits (outcomes) of their QR spending as best evidenced by their performance in past research assessment exercises and the forthcoming REF (2014).

A1.4 Outputs from QR funding

7.1.5 For this study direct outputs from QR funding are grouped under three broad headings:

- Knowledge creation
- Capacity and capability
- Translation – i.e. evidence of effective engagement with external organisations.

Knowledge creation

7.1.6 Notwithstanding the difficulties in disentangling the specific contribution of QR to the generation of research outputs, some HEIs were confident that they could rely on a wide range of metrics to capture both the substance and essence of outputs that can be attributed to QR funding. The PVC for Research at a Top Six research HEI provided an exposition in support of this view:.

‘The other metric which I look at is the number of publications that we generate and also then the number of citations that those publications receive, as the citations are a proxy for how valuable the rest of the world finds that work. There is a thing called the Central Science Indicators. [The Top Six HEI] is the 16th ranked HEI on this list. We have captured in that process something like 6,000 publications a year and I think that also then attracts something like 100,000 citations a year. For me that’s quite a good indication that as an institution we are in that top 20 in the world. I also know from my own data repository collection that in fact we generate something like 9,000 outputs a year, 6,000 are captured by these abstracting agencies, the others will be in areas like Arts and Humanities, or grade literature or PHD theses. So let’s say we produce 9,000 of these a year. I also think that because of the open access discussion which the Research Councils are driving at the moment that maybe 3,000 of those are triggered by Research Council project funding. Maybe another 500 or so may be triggered by Wellcome [Trust] and charity funding. So that suggests to me that about 3,500 items,

maybe 4,000 items, maybe a bit more, are triggered by other supporting processes. Some of those will be PHD theses; some of those will be books and monographs by academic staff. You could argue that that's being produced by QR. This measures the output.'

7.1.7 To a large extent, the main output attributable to QR funding is the increased knowledge generated as a direct result of research that is undertaken or supported by this funding stream. More generally, increased knowledge is conflated with publications (e.g. written books, journal articles, conference papers etc), although the latter represent a range of other more specific outputs, such as overall research expertise that comes from increased knowledge and improved quality of research. This, itself, is often the result of people having the 'space' to think creatively (support that comes from QR funding). It is in this particular respect that the generation of new ideas (knowledge) may be considered the most significant output of QR funding. The significant role that QR plays in research is that it provides researchers with flexibility and 'free space' where research can happen, and enables investigators to move into new research areas and to create new knowledge.

7.1.8 The importance of knowledge creation cannot be under-estimated, as it is at the heart of all fundamental research (i.e. blue skies research). Very often, though, the process of generating new knowledge is slow, and it is difficult for researchers to interact with potential funders in industry until they have very well-formed ideas, or developed new techniques etc. Interviews with principal investigators (PIs) in particular, suggested it is becoming increasingly difficult for researchers to win Research Council grants because of the vagaries associated with their award; and this may delay fundamental research. In such circumstances, the availability of QR funding enables researchers to continue to work, even at lower levels, to develop their ideas and methods and to publish their research findings to show that some of the ideas actually work. This in turn builds the confidence of potential funders whom researchers may approach for funding. Thus, there is a pipeline between having a few ideas, and developing them to a point where they can be supported more widely from external funding sources. The unique role that QR funding plays in this process was summarised by a PI at a High research HEI as follows:

'You need to be able to take risks. If you're only doing things which you conservatively know will work, it is very difficult to explore the ideas of something that you have a feeling would work. You've got to have the space that you can explore the slightly riskier, more ambitious, and more imaginative ideas, where you do not have to deliver against milestones. You've got to have space to do some of the more imaginative stuff.'

Capacity and capability

7.1.9 A wide range of case study respondents reported that QR funding enhances research capacity and capability. Several processes appear to combine to influence and underpin these outputs. Central to it all is that QR funding gives institutions a degree of flexibility in making strategic decisions: for example, recruitment of 'star' research

staff; building and/or maintaining a critical mass of research; retaining key staff; improving the research physical infrastructure; and ensuring diversity of research.

7.1.10 As indicated above, improvements in research capacity and capability in a number of the case study HEIs are often linked to the recruitment of 'star' researchers. A High research HEI for example had used central funds underpinned by QR to recruit two outstanding 'star' bio-informaticians, supporting their salaries and funding their start-up costs, which according to the Head of Department would not have been possible without QR funding.

7.1.11 Similarly, the PVC for Research at a Top Six research HEI had no doubt that QR has enabled the institution to maintain globally competitive research by hiring staff of the highest quality.

'Well, for us it is to be able to maintain globally competitive research, we have to make sure that the quality of the staff that we attract is the highest it can be. It's all about the quality of the people. So how do we know that we are being successful: the REF is going to be good at doing that, every 5 years a benchmark of how you're doing relative to your UK peers, we also invest in a company that analyses knowledge outputs/publications and provides us with a comparative study every year of how this HEI compares with all our North American peers at a Departmental level.'

(PVC, Top Six HEI)

7.1.12 The use of QR to retain key research staff is another means by which HEIs are able to continue to improve both their research capacity and capability. Thus, at a Medium research HEI, QR funding has not only facilitated the retention of key staff, but also provided an incentive to benchmark their performance against external standards and promote them more senior levels.

'We have an opportunity for people to be progressed to Reader and Professor purely against external benchmark. In other words there doesn't have to be a post available. So this is starting to grow the professoriate, but there are no blocks so, in a career development sense, researchers can blend into other things. Ultimately at the level of Reader we're looking for somebody with a leading national profile, and for Professor we're looking for someone with an international profile, as well as a leading national profile.'

(PVC for Research, Medium research HEI)

7.1.13 At one High research HEI, QR funding has raised its capability and capacity by helping to build a critical mass of academic researchers to successfully carry out interdisciplinary work, where the whole is greater than the sum of its parts.

'There's a lot of interdisciplinary work but we'd like to think nearly always from a strong foundation. So, for example, we have an entire Department called Psychology and Human Development with roughly 30 academics in that Department, whereas most largish university Departments of Education in the country would have a couple of psychologists. This makes it much easier for interdisciplinary work if you've got the strength in numbers, i.e. a big critical mass.'

(PVC for Research, High research HEI)

- 7.1.14 At one Top Six research HEI, QR funding has provided the flexibility to enable a better focus on research priorities and the development of new capabilities by facilitating a more multi-disciplinary approach to research across the whole institution.

'So we have a tendency to organise all of our academic activities in a multidisciplinary way, more so than our competitors. Our QR money goes into our Departments and our fundamental organisational structure is more multidisciplinary than it was before.'

(PVC for Research, Top Six HEI)

- 7.1.15 QR funding is being used to strengthen research management capability. A research information management system being used in a number of HEIs allows the individual HEI to collect information on a range of metrics. Academic staff research outputs are recorded on a database, including information on their research grants and research activities. These can be linked to outputs and capital equipment to provide an audit trail and analysis that ties the two together. This enables senior management to ask specific questions about the value the institution is getting from different kinds of investment being made with QR and other research funding streams

- 7.1.16 Similarly, one High research HEI considers the setting up of a research management database to be one of the principal outputs from QR funding. This HEI expects soon to be able match each research publication, for example, against the source of funding of the research.

- 7.1.17 QR funding not only helps to improve overall research capability, but also impacts on less tangible outcomes, such as the reputation. A PVC for Research of a Medium research HEI suggested that there are two ways of thinking about outputs and outcomes and specifying them. First, there are a set of outputs which are more tangible and measurable, including those activities that are measured in the RAE and the REF. Second, there are the intangible measures, such as reputation. The HEI captures both of these measures as part of the submissions to the REF.

- 7.1.18 QR funding has enabled HEIs to develop strategic collaborations with other HEIs nationally and internationally and there is an increasing realisation that overall research capability can be enhanced in this way. One High research HEI sees the outputs from QR funding as the contribution it makes to increased collaborative research, both internally and externally. The HEI in question has developed a number of partnerships with external organisations. Significantly, these partnerships provide an interface to other organisations, which means that the HEI is able to do

more collectively than on its own. The White Rose partnership in Yorkshire, incorporating several HEIs, is very successful and is partly supported by QR funds.

- 7.1.19 For some institutions, collaboration has added benefits, ranging from winning bigger research grants to collaborative teaching at post-graduate level. In the case of two High research universities, the process has involved building links with a number of leading academic institutions, particularly in Europe.

'We do collaborate very extensively, particularly on the research side. We've got partnerships with a number of key institutes of education equivalent across the world, such as Wisconsin in the US, Melbourne in Australia, and the National Institute of Excellence in Singapore. If you go back roughly 10 years ago then it was really up to the individual academics, but now it's a bit more institutionalised. There is an international alliance of leading education institutions, including those mentioned above. We also are more actively developing some reports particularly about driving forward collaborative teaching at post-graduate level internationally. Domestically, it depends more on natural academic interests. Many academics also recognise that they have a better chance of winning the bigger research council bids if they collaborate naturally. We are looking more and more into Europe as well because we are trying to build up our European funding profile at the moment, so we're building an increasing numbers of partnerships, mainly at project level, with specific European partners.'

(PVC for Research, High research HEI)

7.2 Outcomes (benefits) of QR funding

- 7.2.1 The outcomes or benefits of QR supported research arise from changes in the actions or behaviour of private and public sector users of research outputs, including business, government Departments and agencies and third sector organisations. As indicated above, the outputs from QR spending include new knowledge, increased research capability and capacity (human capital, equipment and estate) and improved infrastructure for research translation and wider knowledge exchange activity. The exploitation of these research outputs, by the private and public sector, impacts the economy and society through a variety of different knowledge exchange mechanisms or pathways. Diffusion of research outputs takes place through publications and the recruitment of graduates and post-graduates. There are multiple research commercialisation and technology transfer mechanisms, including research patenting; academic spin-offs; contract and collaborative research; partnerships, and consultancy by individual academic researchers.

- 7.2.2 Chapter 9 of this report presents an econometric analysis to assess the impact of QR on the benefits to external organisations as reflected in their willingness to pay for a range of research-related and commercialisation activities. These payments are made in respect of contractual agreements reflecting the different commercialisation and knowledge exchange mechanisms (e.g. contract research, consultancy, licensing) and are data collected through the Higher Education – Business and Community Interaction Survey (HEBCIS). A challenge of the econometric analysis is

disentangling QR related outcomes where a variety of other funding sources are supporting HEI research and its diffusion and commercialisation. The case study approach is also limited in that the assessment of QR related benefits is based on *subjective* judgements of the importance of QR relative to other research funding streams in generating benefits. Moreover these assessments of benefit reflect only the benefits perceived by the HEI and not by the beneficiary organisations and individuals.

7.2.3 In addition to the outcomes/benefits enjoyed by different external organisations, there are specific benefits from QR funding for HEIs and academic researchers. These benefits are reflected in the profile of case study QR expenditure documented in Chapter 6. For example, the use of QR to enable the recruitment of new research and support staff was widely reported by the Top Six and High research HEIs. These appointments are direct employment gains for the HEI and potentially for the UK economy. The employment of new high quality research 'stars' may in turn improve the productivity of existing staff in the HEI and new staff may collaborate and share their expertise to support R&D and innovation in industry.

7.2.4 QR generates 'reputational benefits' for HEIs and their individual Departments insofar as it raises the quantity and quality of their research outputs (publications/citations, research capacity and capability) and increases user engagement with and exploitation of their research. In this respect, the appointment of 'star' researchers from abroad was a key factor in a number of case studies, while QR also supported development of a 'critical mass' research capability more broadly. The benefits of attracting very high quality research 'stars' are skewed towards the Top Six and High research HEIs, although some smaller HEIs benefited because of their research specialisation.

7.2.5 What may be described as 'reputational gain' was important for two very different institutions, one a Medium research and the other a Top Six research HEI. The PVC for Research at the Medium research HEI provided evidence that shows that the institution is ranking in the top 100 universities in the world that are less than 50 years old. The ranking is not solely in respect of research, but research is a significant part; and the PVC's view is that it is international recognition of the institution's research that accounts for the ranking. The PVC described the real significance of the HEI's position thus:

'Travelling round the world nobody knows where this HEI is, but people are starting to know and this has helped us recruit better staff, get more business contracts and get more noticed in Research Council applications.... As a consequence of developing research which is underpinned by QR funding, we have driven up research income from about £3m a year to a projection of £10m for this year. For a university of this type, with the number of research staff that we have, then that puts us at the top end of the Post-92 HEI income generators.'

(PVC for Research, Medium research HEI)

7.2.6 Individual researchers benefit directly from QR (in combination with funding from other sources) when it enhances their research profile (and career opportunities) by enabling more publications and higher quality research. In Chapter 6 above, case study evidence suggests widespread use of QR in support of young promising researchers. Further benefits for post-graduate researchers are also apparent and derive indirectly from QR, in that it enables high quality research training in a leading edge research environment thereby improving their employability in the more research-intensive sectors.

7.2.7 Another set of outcomes/benefits arise from the general impact on the local community. For example, researchers at one HEI are working with the local Children's Hospital Trust, and carry out musical activities with patients. The initiative has begun to transform the HEI's relationship with the community into a partnership.

Translation, collaboration and engagement with external organisations

7.2.8 Impact may be seen in the way that the HEIs engage with external organisations. Demonstrating such impact is much easier for some institutions than for others; for some institutions, demonstrating impact appears to be more straightforward because it is part of an ethos that is reflected in their public engagement strategy. The PVC for Research at one High research (specialist) HEI described the institution's public strategy as making it "perfectly appropriate for their staff" to, for example, write for a greater range of audiences, and to give presentations that are not just for an academic audience, but appropriate for industry and other external organisations. The viewpoint of the PVC at this institution was that while staff will get 'brownie points' for doing this, it is more an internalised culture, albeit one that has also helped to impact the agenda of the REF.

'This is important because 20% of the funding formula/algorithm is determined by impact. This rule has been introduced across the board, but for us as a social science institution this change is fine. It marries up with the Research Councils that want to see pathways to impact, so people are already used to thinking about it when they are putting in a Research Council bid – What's the potential impact of this piece of work and where might it lead us to?'

(PVC for Research, High research HEI)

7.2.9 To some extent, the increase in the quality and quantity of research can be attributed to the role of QR in facilitating interdisciplinary and collaborative research, often with other HEIs and, increasingly, with external organisations. In this regard, the outputs from QR funding may be considered within the wider context of its contribution to the overall research capability of the institutions; and QR funding may also be considered to contribute to increased collaborative research, both internally and externally.

7.2.10 The weight of evidence from the interviews with senior management points to an increasing trend towards translational research. Indeed, the Finance Director at a High research HEI suggested that HEIs are acutely aware that much of their research

is supported by funding from the public purse. Consequently, there is almost an imperative for HEIs to demonstrate as much as possible the wider benefits of the research that is supported in this way.

'What we would like to say, and what we can say, is that as a consequence of research that we have undertaken here, breast cancer rates have gone down by, say, 30%. That is what the public wants to know. They want to know that the money has been invested wisely, with good people who can deliver a life-changing outcome for them.'

- 7.2.11 Similar sentiments were expressed at another High research HEI, where the focus of QR funding has been more on applied research and consulting, rather than blue skies research.

'When we last formally looked at the Research Consulting Knowledge Transfer strategy, it was much more about trying to put procedures in place such that all the aspirations of the previous strategy were more likely to be fulfilled, rather than an actual shift of emphasis. This strategy is looked at every five years, the last time being in 2010. The one obvious shift is, because of policies like HEIF funding and the national realisation of the importance of universities to economic growth and business; there has been a slight ratcheting up of the applied research element compared to the 'blue skies' element. I think as an institution we've always been stronger on the consultancy and knowledge transfer than perhaps other organisations.'

(PVC for Research, specialist Arts HEI)

7.3 Conclusions

- 7.3.1 Expenditure from QR funding has generated a wide range of research related outputs, benefits and impacts. Most importantly, it has enabled the generation of new knowledge (fundamental or blue skies, applied and user driven) in part reflected in publications of one kind or another but also in terms of knowledge for and communicated directly to, public and private sector organisations.
- 7.3.2 QR has also contributed to improvements and additions to the research capacity and capability of HEIs. These include both physical capital in the form of new or refurbished buildings and equipment, and human capital, most importantly academic researchers.
- 7.3.3 The benefits derived from QR funding are both social and economic. HEIs enjoy reputational benefits and individual researchers enhance their reputations and career prospects. External organisations benefit from research outputs which complement and support their R&D and innovation. Society more generally benefits from improved economic performance, from improvements in technology (health and medical benefits) but also culturally from the outputs of the Arts and Humanities disciplines.

8 Assessing the Counterfactual

Panel 8.1 Key findings

- *Of the case study HEIs, 23 of 25 reported that a reduction of QR would be extremely challenging and that depending on the scale of the reduction, the most likely outcome would be a reduction in research activity, possible redundancies and reductions in the quality and volume of research outputs.*
- *The impact of QR reductions would be particularly severe for the more research-intensive HEIs. Less research-intensive HEIs would in some cases no longer be able to count themselves as research active.*
- *Several HEIs indicated that interdisciplinary research would be vulnerable to cuts and that expenditure on new equipment would be curtailed or deferred.*
- *The ability of HEIs to bid for Research Council and charitable funding would be diminished leading to a potential spiral of decline in research activity.*
- *Replacement of QR funds was seen to be difficult with limited possibilities to raise funds internally.*
- *Some concern was expressed that research funding might be switched to Research Council funding. The Dual Support system in its current form commanded widespread support.*

8.1 Introduction

8.1.1 This report presents extensive evidence on how QR is allocated, the research activities it supports, the funding that it attracts for the HEI and the research outputs and impacts generated. But what would the counterfactual look like? In addressing this question respondents were asked three questions:

Q1 What do you consider would be the effect on your overall research investment/activity of a reduction in QR?

Q2 Had you not received QR funding how would this have affected the outputs/outcomes identified earlier in relation to their current levels?

Q3 What do you think would be the implications for research activity and output from your university if the allocation of QR was based on some alternative method?

8.1.2 Question 1 looks to the future and seeks to explore the potential consequences for HEIs of a reduction in QR. These consequences break down into two elements, which are related but for purposes of analysis are important to distinguish. The first element consists of direct or short run effects on the level of research income, research activity and output in the HEI (e.g. academic staff redundancies, non-replacement of equipment, limited sabbaticals). The second element consists of impacts which may unfold in the longer run (e.g. a gradual erosion of the higher education sector's current research infrastructure and capability, intensifying HEI competition for funds from other sources, including income from teaching). Potentially, these longer run effects could lead to a reduction in the dissemination of research outputs to external users, with possible adverse consequences for their growth and development. These dynamic longer term effects will vary across HEIs

and depend on how well they adapt to the reduction in QR income and their changed financial circumstances more generally.

- 8.1.3 Question 2 is the familiar counterfactual question in that it seeks to establish how research outputs/outcomes would have evolved in the absence of QR by comparison with how they actually evolved. In other words we are seeking to establish the 'gross additionality' generated as a result of past QR funding of HEI research.
- 8.1.4 Question 3 seeks to explore the implications of alternative methods of allocating QR and respondents typically focused on the implications of shifting the balance between QR funding and Research Council funding.
- 8.1.5 It is of course recognised that any approach based on the subjective assessments of those that benefit from QR funding is vulnerable to the criticism that it cannot establish a credible and rigorous counterfactual. This problem is compounded by the qualitative nature of the effects of QR being considered. While we accept that this is the case, this subjective approach provides informed insights and opinions from individuals closely engaged in managing and using QR funding in the context of the overall funding of research in their institution. It also brings into sharper focus those beneficial effects of QR that are perceived to be most vulnerable to changes in the current funding system. Importantly, it has to be appraised alongside the findings of the econometric research which focused on disentangling the quantitative impact of QR on Third Mission income.
- 8.1.6 Evidence on the counterfactual derived from the interviews with HEIs focuses on the process implications of reductions in QR. This includes the activities in HEIs supported by QR funded resources (e.g. research and knowledge diffusion), the outputs generated by these activities (e.g. increased knowledge, enhanced research capacity and capability) and intermediate outcomes (e.g. more efficient and effective research infrastructure, increased engagement with business and other external organisations). Each element in the process will, in principle, include its (unobservable) counterfactual. The focus of the analysis here is also on 'gross additionality' and does not explore the implications for displacement and substitution of activities and outputs supported by QR.
- 8.1.7 A further difficulty in assessing the counterfactual is the question of whether there are options/opportunities for limiting perceived adverse effects on research activity in the event of a reduction in QR. This could involve issues of efficiency savings, improved management and organisation of research, increased selectivity and development of critical mass, more collaboration and partnering, securing more research funds from alternative non-governmental sources, outsourcing to low cost research inputs. The potential for effective adaptation will differ with respect to each of these.
- 8.1.8 It is also important to point out, particularly when considering the responses to Question 1, that the context for QR support has shifted in the past decade or so. HEIs are recognised as being much more important in the contribution that they make to the knowledge economy and the role that they play in supporting innovation and

competitiveness in the private sector through Third Mission engagement. As such, a reduction of QR today may be seen as significantly more damaging than a similar reduction a decade or so ago. Arguably, scientific talent in HEIs is more internationally mobile and responsive to differential pay and conditions across countries; competition for such talent has increased; firms in newly emerging economies in Eastern and Central Europe and the BRICs (Brazil, Russia, India and China) are moving up the value-added chain. At the same time, the capacity and capability of many HEIs to engage more effectively in the dissemination of research outputs to the business community has increased with potentially important implications for generating Third Mission income.

8.2 Effects on research activities and outputs of a reduction in QR

- 8.2.1 The case study evidence reported here relates to both Questions 1 and 2 referred to above and where evidence is presented relating to Question 2, this is indicated in the text. In discussing the impacts of QR reductions, no specific numeric reduction was posited, although it was made clear to respondents that the effects of a significant (more than 10%) reduction were being sought. Responses to Question 3 are discussed separately.
- 8.2.2 The substantive responses on the impact of reductions in QR break down into three broad areas – the impact on research capacity, capability and output; the impact on the type of research and different disciplines; the impact on students and teaching – Panel 8.1. Not surprisingly the pattern of responses reflected the obverse of respondents' perceived impacts of QR. However on a priori grounds a degree of hysteresis would be likely, for example where QR has been instrumental in building bridges across different disciplines, although typically hysteresis effects were not a focus of discussion. A number of HEIs did point to the possibility of dynamic interactions between these three broad areas of impact. For example, HEIs reporting reductions in research activity also tended to report implications for student numbers and teaching quality.

Panel 8.1 Broad areas of impact arising from reductions in QR

- **The impact on research capacity, capability and output**
 - Loss of research staff through labour mobility to other HEIs at home and abroad, difficulty in recruiting top staff, loss of morale
 - Less training of research scientists and less diverse staff, career uncertainty
 - Increasingly out of date and obsolescent scientific equipment
 - Reduced ability to leverage other income which would amplify the above effects
- **The impact on the type of research and different disciplines**
 - Less leading edge/blue skies research, inability to keep in touch with new research developments and changing research portfolio in favour of applied/user inspired research, loss of flexibility
 - Disproportionately adverse effects on certain disciplines such as Arts and Humanities and Social Sciences
- **The impact on students and teaching**
 - Loss of high quality post-graduate students
 - More teaching of undergraduates and increased use of post-graduates for teaching
 - Teaching less informed by research
- **Alternative funding sources**
 - The search for other sources of income – fees, Third Mission, business, charity
 - Intensifying competition across HEIs

The impact on research capacity, capability and output

8.2.3 All but two of the senior HEI respondents (PVCs of Research, Directors of Resource Planning or Finance) reported that significant cuts in QR would have adverse effects on the scale of the research portfolio and the employment of research staff. They anticipated that there would be redundancies, suppression of posts and difficulty in recruiting and retaining high quality research leaders. It was also recognised that the full implications of QR reductions would not be seen in the immediate future, but rather it would be in the longer term when the loss of diversity and the richness of what comes out of research in HEIs becomes apparent. The anticipated scale and severity of impacts varied across HEIs and depended not only on the scale of QR reductions being considered but also on the perceived ability of the HEI to replace QR reductions with funding from other sources, including internal institutional funds. Substantial adverse impacts were anticipated across the majority of HEIs. These include not only the Top Six and High research HEIs where QR is a major source of funding and deeply embedded within their overall financial structure but also the less research-intensive and Arts HEIs receiving much smaller amounts of QR. A number of the latter believed that they might no longer be able to count themselves as research active and would ultimately have to revert to teaching only. Adverse impacts on the quantity and quality of research were reported at all organisational levels within HEIs – the Centre, the Schools, the Department and at the level of the Principal Investigator.

'Our QR is so large and so corpus, it's out there and fundamentally embedded inside the university that it would lead to a dramatic cut in

the size of the university and there would be fewer academic posts. There would not be as many academic staff that's absolutely clear, there would have to be massive reductions in head count actually.'

(Director of Resource Allocation, Top Six HEI)

'It will be horrific. It will be a disaster for the university because effectively, this will be £20 million of QR coming to the university, funding research; and let's remember that research tends not to pay its own bills. But research is something that universities have to subsidise. So QR is one of the essential sources of income into the university. £20 million less is £20 million of research we will [not] be doing, which means a third of our research will go straight out of the window.'

(Director of Research and Enterprise, High research HEI)

'The other consequence that will happen is that a lot of our top scientists would leave, to go to America or to go to other European universities. So there will be a mass exodus of people. Because if the Schools lose all their income from QR, people will leave to go overseas, and that's very easy actually.'

(PVC for Research, High research HEI)

'The effect on our overall research strategy would be that our overall research activity would definitely fall. QR really helps us pursue excellence in research. We'd have to become much more money-minded. Obviously we want to ensure the financial sustainability of the institution, but at the moment with QR funding we don't have to worry about every little penny because we know that there is an income stream that supports the institution as a whole. Absolutely, jobs would go if there was a reduction in QR.'

(PVC, High research HEI)

- 8.2.4 Notwithstanding the smaller contribution to overall income that QR makes to the Medium/Low research-intensive and Arts HEIs, its contribution to research funding may be very substantial and in these cases a significant reduction in QR may have potentially 'disastrous' impacts on the quantity and quality of research undertaken in those HEIs. Research in the Arts HEIs would experience a significant impact owing to the relatively limited funding that they receive from the Research Councils.

'QR is a completely vital and essential source of funding for our university and the idea of QR being taken away would be totally destructive. It is a relatively small sum of money but QR has been used very effectively in research and gone a long way in art and design and practice.'

(PVC for Research, Arts HEI)

- 8.2.5 Respondents expressed concern that reductions in QR would limit the opportunities for matched and leveraged research funding from Research Councils, charitable foundations and other organisations such as the EU. The contribution of QR to meeting the FEC of research would also be constrained. It was argued that this could result in a potentially damaging spiral of decline in research income and research capability.

'A loss of QR would lead to a significant reduction in academic staff but as well it would mean a significant reduction in the university's Strategic Planning Reserve Fund which is used among other things, to support matched funding for projects supported by Research Councils and charities. When a funder comes along and when they are looking for matched funding, whether it is the Wellcome Trust or even Research Council, it is our ability to make that co-investment that is critical and we would absolutely reduce our capacity to be able to apply for charitable, Research Council and EU funding. So actually it would begin a spiral of descent so we would start by cutting staff numbers, there would be fewer people who are writing grants so our research income as a whole would go down radically.... Cancer Research UK for example although they are a UK charity, they could take their research offshore. Charity QR in particular is critical.'

(Director of Resource Planning, Top Six research HEI)

- 8.2.6 The risk that a reduction in QR initiates a downward spiral is clear from the statement of the Director of Research and Enterprise of a High research HEI.

'And not only that, but we can use QR to underpin and invest in research which we then win grants from. So if the QR went, we couldn't make that investment and the grants will go down; and that will be true of many universities, I think. So, it will be a pretty bad result for the university. Therefore, every pound of QR we lose potentially loses the leverage. So, another reduction of half a million pounds is not half a million pounds in terms of our research funds; it's potentially £1 million or £1.5 million that we lose, because we lose the ability to use that for leverage. It is the multiplier, and, therefore, the damage that is done in terms of our investment propositions. Therefore, a further reduction [of QR]... is very challenging for us.'

(Director of Research and Enterprise, High research HEI)

Effects on specific disciplines

- 8.2.7 A reduction in QR would have very uneven impacts on research activity and output across different disciplines. It was widely reported that the Arts and Humanities and to a lesser degree Social Sciences and Pure Mathematics disciplines were particularly vulnerable and would increasingly focus on teaching were QR funding to be reduced significantly. This uneven impact arises because, across broad disciplinary categories such as Art and Humanities, income from QR is a significantly higher proportion of research income than is the case in for example, Engineering. This balance it was argued is appropriate if one looks at the way research is done in disciplines such as Arts and Humanities, compared with disciplines in receipt of a project based funding from Research Councils. Project based funding tends to be targeted towards a clear outcome or specification of what research output is going to be delivered and lends itself much more easily to time limited project or programme funding than in discipline areas such as Arts and Humanities, Pure Maths or Theoretical Physics.

'It [a significant cut in QR] would severely damage the Arts and Humanities. Although we've seen a great increase in research income generation in the Arts and Humanities, it's still not big. If you think what the average is for the Russell Group, £18,000 per FTE, QR is supporting a huge amount of the research output of the Arts

and Humanities and Social Sciences in this university. And if there was a sharp reduction, it would be devastating.'

(Head of Department, High research HEI)

- 8.2.8 Disciplines vulnerable to disproportionate reductions in QR will become more reliant on teaching income and research output will be threatened as the teaching becomes the dominant focus of academic activity.

'Where it will be immediately and drastically felt will be in places like the Arts and Humanities, where the Departments will be reliant on their teaching income to all intents and purposes. And if they are reliant on their teaching income, then they are teaching Departments, they are not research Departments, and in the social sciences, particularly the ones that are not the big grant winners – Politics, Economics, Management – those ones will increasingly have to be teaching focused.'

(Director of Research and Enterprise, High research HEI)

- 8.2.9 The Head of a humanities Faculty at a High research HEI contends that without QR the School's administrative and teaching loads would be such that research staff would have great difficulty in finding the time and resources to write bids for funding from Research Councils, industry and charitable organisations. This touches on a particular issue about what QR is spent on. It is contended that one of the things the School could not have, in the absence of QR, is any form of study leave, which is really a disciplinary norm in the Humanities disciplines.

- 8.2.10 Both the Research Manager and the Director for Research in the Faculty of Arts of a High research HEI assessed the effects of a severe reduction in QR on the Faculty's research investment and research activities:

According to the Director:

'The immediate impact would be on our cost base, which is dominated by staff costs. You can imagine the various scenarios being prepared with QR, which will have a knock-on effect. If we were looking at a 10% reduction, then that tightens everything considerably. It means, probably, that we'd be looking at fewer staff to teach the same number of students, and so there will be less time for research. There'll be less research, and we'll become a less research-intensive institution.'

As to the implications:

'To take just one area, the kind of impact that our research is able to have on our relationships with our partners would reduce; so our partners will see less of our research. Our students would be taught in a less research-intensive University. For us the relationship between research and teaching is extremely important, and is something that we see as key to the intellectual experience that our students get. There will be less research published, and the UK's leading place on the international stage would be much less.'

And from the Research Manager:

'Ultimately it puts at risk financial sustainability for a lot of areas. It would almost lead to a downward spiral; once you lose that then you've got teaching and no research happening, and it just feeds into that downward spiral.'

'[With] No QR, we would be in massive deficit. With recent QR cuts the impact has mercifully been marginal and has been made up from donor funding but external donor funding is determined by the core strength of the Faculty and with 10% cuts we would be getting £250k per annum less in income. Part of the picture would be the impact across the university but in my Faculty it would mean the suspension of posts on a vacancy and that would be damaging and reduce our capacity to renew ourselves and you have to grow and keep developing or you are going backwards.'

(Head of Department, Top Six research HEI)

- 8.2.11 For disciplines with high scientific equipment and laboratory needs, there is concern that a fall in QR would also lead to a growing stock of outdated and obsolescent physical capital and the re-emergence of a research infrastructure 'deficit'. Deteriorating and out of date equipment would in turn exacerbate the difficulties of recruiting high quality research staff, which in turn would undermine efforts to secure research funding. In the bio-sciences, in particular, the pace of change is such that there is a need for continuing renewal and upgrade of facilities. The Head of School in a High research HEI responds:

'I think it will be severe because we wouldn't be able to help replace equipment that is necessary for high-end research; we wouldn't be able to employ the staff who run that, and I guess we would probably find it more difficult to run the cross-Faculty university-level facilities, which are also very expensive. And I suppose we wouldn't be able to have so many academics, and the academics that are left would have to do more teaching and they wouldn't have the time to develop research in the same way.'

- 8.2.12 In response to Question 2 on the possible effects had QR been reduced over the past six or seven years, the Head of Department at a Top Six HEI emphasised the threat to research facilities and the wider research infrastructure:

'I think it would have been felt particularly at the senior recruitment level and I think it would have been in terms of both quality and the volume of research output. In the sense that we know that over the past few years there have been various halts and efficiencies in capital spending in terms of not large scale capital investment, but just simply the updating and refreshing of equipment within Departments. That's been squeezed anyway and that would have

been almost impossible. That would then lead to a general degradation of facilities and then that both reduces the output of the people existing in the Department and reduces your ability to get new recruitment. I think the whole range, from mid-range equipment level through to the Science Research Investment Fund (SRIF) level of laboratory or building development – so not the very large institutes (not the “we are going to have an Institute of Nanoscience) but simply “we need to upgrade our NMR facilities”.’

- 8.2.13 Relatively small sums of money were seen to be potentially threatened by reductions in QR.

‘In an ideal world we would have everything funded and on grants. However, it’s not an ideal world, so the research money [which includes QR] is used essentially to make sure that every piece of kit in the School, or most of it, is operable and available to everybody to use. Without a research strand to our funding, I think that inside about five years we will just run out of equipment. It’s as simple as that. The operational glue to this place is a sum of money for maintenance and so forth, which is of the order of £20,000. It’s not a lot of money, but if we didn’t have it, we would gradually run out of maintenance money.’

(Head of School, High research HEI)

Nature of research

- 8.2.14 The non-hypothecation of QR provides a degree of flexibility in terms of the nature of research that it supports in HEIs. In discussing the impact of a reduction in QR respondents focused on three ways that the balance of their research profile would be shifted:

- Blue skies basic research versus applied and time limited project-based research
- Interdisciplinary research versus single discipline research
- Long term strategic research versus short term research

- 8.2.15 The most frequently reported response was that a reduction in QR would lead to a gradual shift away from blue skies (discretionary) research towards more applied research linked to specific projects and research programmes funded by Research Councils, charitable foundations and industry.

‘I think in a university like this, we will probably have to focus much more strongly on only commercial income, and I think the very clever stuff that is further from the market place, I think we would be less able to do that. And I don’t think that is the kind of environment I would like to have in a university. The commercial income is important to us, but I think even your ability to generate commercial income is enhanced by a good all round capacity in research at a level that is further from the marketplace. I think you need that spectrum of activities, and the QR income is vital for that.’

(Head of School, Medium research HEI)

‘There are two likely impacts of that reduction (in QR). One is that research would flow into a much more practical and ‘presentist’ framework. By that I mean there have to be applied research results, and presentist is that it would have to respond to the actual priorities

at that moment of the research funders.'

(PI, High research HEI)

- 8.2.16 This shift towards more applied time limited research, funded largely through competitive bidding for grants from a range of external organisations including Research Councils would, it was argued, limit academics' autonomy in the choice of research that they might pursue and increase the proportion of contract research staff.

'Ultimately we would be completely at the mercy of the market, and I don't think it would be possible to meet our ambitions internationally, in terms of the brand of Britain, and in terms of social science, particularly in Sociology. Already the pressure is on for us to become trainers, and we do [do] training, but that is a totally different job. But we would also be at the mercy of the market in the sense that there are areas of social sciences and humanities that are important, but won't be funded by certain kinds of organisations, markets or Research Councils, given their competitiveness. So ultimately we would reduce in size, and that's the reality. And we would have to be less ambitious.'

(Head of Department, Top Six HEI)

The impact on students and teaching

- 8.2.17 Directly and indirectly reductions in QR were perceived to impact adversely on teaching and the long term sustainability of research capability. The departure of research staff and increased difficulty of recruiting high quality research leaders would weaken the capacity of HEIs to train and develop the research capabilities of young researchers.

'But the counterfactual is we could not deliver the research that we do. And I think there will be a great loss to that. I think where the next generation of academic research scientists is going to come from really causes me some anxiety. The number of people who are setting up small consultancies because they don't see how they can actually develop an academic research career because they have to get through a phase of training, development, learning, doing nationally relevant stuff in order to be a world leader, to get to doing things so worldly that nobody else is doing it. And I actually think there is a real risk that the pipeline will dry up.'

(Director, High research HEI)

- 8.2.18 The education and training of undergraduates and post-graduates would suffer both from the departure of high quality research staff and the increased time that would be spent by academic researchers seeking external funding to replace QR.

'They [PhD students] all benefit from QR. If we remove that element of funding it would not only impact upon the lecturer, Professor and Reader levels but it would have quite a big impact on the quality of the training to the graduate students.'

(Head of Department, Top Six research HEI)

'QR is absolutely critical in terms of research as the strategy is to give people time to do their research and it's QR that gives them time for their research. I suppose the way I think about it is 'What is

an academic doing? Well an academic is doing teaching and research and their teaching is paid for by the teaching funds we get and the research is paid for by QR. And what does that mean? Well it means we pay them over the summer for their teaching and we give them a sabbatical every few years and we give them a lower teaching load here than an institution that doesn't have QR. So if we didn't have QR we would need to change the staff-teaching ratio. We would either have to recruit many more students or lose some staff.'

(Head of School, Top Six research HEI)

- 8.2.19 Potentially damaging long term dynamic consequences of a reduction in QR were also reported as any substantial departure of research staff would not only weaken specific institutions but because they work in an international labour market their potential migration to overseas institutions would have national implications.

'I think we would be hugely handicapped. We would do yet more than we're already doing to seek external research funds. This would be at the cost of our engagement with students, I suspect. It could push a School like this into a kind of two-tier system, where we try to get a lot of our teaching done by post-graduates, for example, which we don't do. We rarely use post-graduates for this. I have taught in America for a while, where you use a lot of post-grads and teaching assistants for undergraduate teaching, reserving your regular staff to work on trying to generate one research bid after another for what the Americans call 'soft money'. And I'm not sure who benefits from that. It [QR] can look like a luxury, but it's really a fundamental enabling resource for us. The university would have to think very hard about how to rebalance everything so that somehow research could continue, without which a major part of what we're doing would fall away.'

(Head of Department, High research HEI)

8.3 Implications for research activity and output if the allocation of QR was by some alternative method

- 8.3.1 The government funds HEI research through the Dual Support system in which higher education funding bodies provide funding as block grants to HEIs for research infrastructure, (the bulk of which is QR funding) and Research Councils provide grants to specific research projects and programmes of research. In the past decade the balance of funding has shifted away from mainstream QR funding towards Research Council funding although non-mainstream QR funding has partly offset this shift. This shift in the balance of funding towards more project-based funding and a reduced share of block grant funding has also been a feature of developments in other countries, notably Germany and France.

- 8.3.2 As an approach to funding research in the higher education sector, the Dual Support system commanded widespread and strong support from a large number of respondents. Various arguments were put forward in favour of the system and the current balance between project-based Research Council funding and QR funding:

- If QR were to go or be significantly reduced as a share of total research funding, much more time would be taken up securing grants.

- QR funding is valuable for the leverage it provides in securing funds from other sources including Research Council, charitable foundations and industry.
- The Dual Support system facilitates flexibility in moving from one area of research to another.
- More funding from RCs would mean academic programmes being driven too much by those researchers who bring in lots of grants rather than those with a more scholarly approach.
- If QR were to be hypothecated the way Research Council money is, we would be locked into a system that lacks innovation and agility.
- Directing more money into Research Councils would distort research priorities.
- A shift towards Research Council funding would mean that fundamental research and innovative support for it would become subject to the vagaries of the grant application process, the agenda of peer review panels and the limitations of Research Council themes.
- Research Council money just covers research with little time left for analysis.
- Concern that if HEIs were increasingly forced to invest their own money into research to support proposals it would drive perverse behaviours.

8.3.3 A number of respondents emphasised the importance of QR in funding leading edge, high-reward, transformative research, arguing that Research Council funding is less likely to be available to support this kind of high risk research activity than research with more certain outcomes. One PVC for Research believed that this was particularly important in the UK where, unlike in the US, there are relatively few available funders and the chances of failing to secure funding, particularly for larger blue skies research projects, are therefore much higher in the UK. The UK overcomes this problem by having QR which can be used to keep really high quality forward looking research properly funded.

'Now we could say let's put it all into Research Councils, but I would say that if we were to do that we need more Research Councils not less, because all the money in one pot evaluated in one way is simply not going to be adequate to support what we need. So to that extent I think the Dual Support system is a reasonable and good way to go about it.'

(PVC for Research, Top Six research HEI)

8.3.4 Project-based competitive funding can potentially limit academics' autonomy to direct their own research agenda. Shifting the balance of research funding towards Research Councils is also likely to increase the number of research staff in time limited contract posts and hierarchical relationships with tenured academic staff.

'We support it mainly because of the belief that it is really important for universities to maintain that sense of academic independence that they can pursue things that they think are interesting and that academics can feel free to pursue what they think is interesting and this is true of all top universities internationally. How QR is calculated, whether you go through a research assessment exercise or whether you do it in proportion to grant income is a separate issue but the actual fact that you've got these two separate streams of funding – one that comes in response to particular research grants

etc. and the other that comes as a response to research activity and quality is tremendously important for this university.'

(Head of School, Top Six research HEI)

- 8.3.5 Arts and Humanities Schools were particularly supportive of the Dual Support system owing to the high proportion of their research income that comes from QR.

'Humanities gets something like 75% of its income from QR which is well in advance of the other disciplinary areas and if you look at the way research is done and the kind of research that's done that kind of balance seems more or less right for Humanities.'

(Head of School [Arts & Humanities], Top Six research HEI)

- 8.3.6 The Dual Support system was also compared favourably with research funding approaches in other countries. It was indicated above that France and Germany have shifted research funding for HEIs in favour of project based funding. These changes have been introduced progressively since the end of the 1990s.

'The UK system, per pound, is the most efficient system in the world. And it is efficient because at its heart it is, in a sense, a form of competition that creates a very strong incentive for people to work hard, and so on. If we went to a system that was much more managed, it might be more logical, it might be easier to explain to ministers, you will inevitably decrease competition. And to get the same quality, you will have to pay more, because your efficiency will go down. So the French system is more expensive than the UK system, but it produces much less outputs. The good thing about our system is that there is a balance of the way that money is allocated. There is quite a lot of money that is allocated through projects that you bid for directly through grants. And that's good. But there is also this balancing aspect of QR. And if you put the money either all into the projects or all into the QR, as the French system, it's not as good. Having a bit of both is a very good, healthy thing.'

(PVC for Research, High research HEI)

8.4 Conclusions

- 8.4.1 Almost all of the case study respondents argued that reductions in QR (past or prospective) would be severely damaging to their research activity and the quantity and quality of their HEIs' research output. In the short run (up to three years), the most frequently postulated counterfactual was a reduction in research capacity and research output and a switch away from research towards more teaching. Although it was widely recognised that there were alternative sources of research funding, researchers would be handicapped by having less QR for leverage, the need to give more time to teaching and greater difficulty in retaining and attracting key academic researchers. Competition for such funds would intensify and there was some concern that this would damage the less research-intensive HEIs more than the research led group of HEIs.

- 8.4.2 In the long run it was widely felt that the impact of ongoing QR reductions would potentially undermine the core research infrastructure, particularly if the reductions were such that the core research capability and capacity could not be sustained or

strengthened. A reduction in QR was seen to threaten the long term development of HEI Strategic Research Funds, which in turn would undermine the capacity of the more research-intensive HEIs to attract funding for major long term strategic initiatives. The long term erosion of the core infrastructure would have further implications for attracting international research leaders and for securing funds from the EU and charitable foundations.

- 8.4.3 Alternative methods of allocating research funding focused on the balance between non-hypothecated QR and Research Council project/programme based funding. The Dual Support system finds strong support from the great majority of HEIs and at all levels of the institution. The two elements of the system, project based Research Council funding and block grant QR funding must be seen as complements rather than as substitutes when reviewing possible changes in the balance between them.
- 8.4.4 Further evidence of a quantitative nature on the counterfactual will be provided in the next chapter, which provides economic estimates of the impacts of QR.

9 Relationship Between QR And Third Stream Incomes: Econometric Analysis

Panel 9.1 Key findings

- *Third stream income (TSI) is used as a proxy for the impact accruing to external organisations and measures the willingness of these organisations to pay for a range of research related activities and commercialisation derived from research in HEIs.*
- *There is a statistically significant and positive relationship between total QR (QR including non-mainstream QR) and the generation of TSI. The relationship is non-linear with the biggest effects occurring at higher levels of QR income per head.*
- *A similar relationship exists between Research Council (RC) funding and TSI and between the combined value of QR and RC funding. This makes it difficult to distinguish their separate impacts and it is best to see them as making a combined complementary impact.*
- *The Higher Education Innovation Fund (HEIF) is shown to make a positive impact in enhancing the role of total QR and RC funding..*

9.1 Introduction

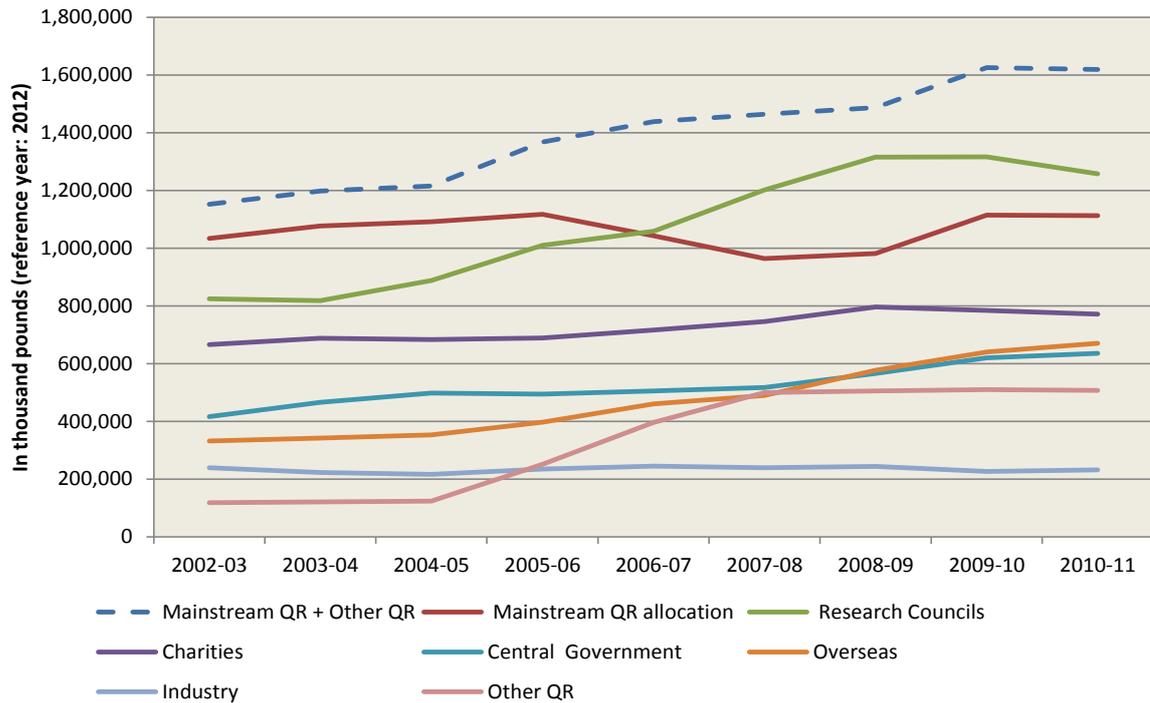
9.1.1 In this part of the work we provide an overview of the main trends in university research funding streams for English universities taking all subjects together from 2002/3 to 2010/11. We then provide an analysis of these sources of research funding disaggregated into four main subject groups (STEM, Health, Social Sciences and the Arts and Humanities). We then link data disaggregated by university covering their sources of research income to impact variables available from the HEBCIS dataset on third stream activity and provide a detailed analysis of the distribution of each of these income and funding streams across individual universities in the UK. This analysis covers the period 2003-2011. We then carry out an analysis of the impact of research funding on TSI generation. The impact analysis is possible only at the level of universities as a whole (because the HEBCIS impact data are not reported below that level of aggregation). In this impact analysis we attempt to account for variations across universities in terms of their generation of TSI as a whole. We employ multivariate econometric techniques which allow us to identify the relationship between previous success in generating TSI, non-hypothecated QR funding, other sources of income, and a variety of other factors potentially affecting the generation of TSI. These include the employment of specialist commercialisation staff and the receipt of HEIF funding at university level. In each case, we allow for variations in the scale of university activity by expressing the sources of third stream revenue and the inputs of research funding and other activities as a ratio of income per FTE number of staff.

9.1.2 We experiment with appropriate time-lags and our analytical method is robust to problems arising from the co-linearity of the variables relating to the structure of funding, as well as to the possible effects of extreme observations and outliers in the relationship.

9.2 Non-hypothecated and other sources of research income: trends over time and variations across broad subject groups

9.2.1 We begin by comparing trends in non-hypothecated and other sources of funding for university research in England in the period 2002/3-2010/11. Figure 9.1 presents summary data in constant 2012 prices. The table provides data on RC funding, charity funding, central government funding, overseas funding, and industry funding for research. It also provides data on mainstream QR and other QR separately as well as the sum of mainstream and other QR (total QR). The table shows that the relative positions of mainstream QR and RC funding have shifted over time. By the end of the period, RC funding is higher than mainstream QR whereas at the beginning of the period it was lower. Charity income has risen over the period, but has been in decline since academic year 2008/9. Industrial income has been stagnant over time. Overseas income has shown a tendency to increase, as has central government funding. In terms of the non-hypothecated component of the Dual Support system, it is clear that the growth of non-mainstream QR has offset the relative weakening of QR compared to RC funding, so that over the period as a whole the sum of mainstream QR and other QR has risen substantially in real terms. All series show a weakening in the period after 2009.

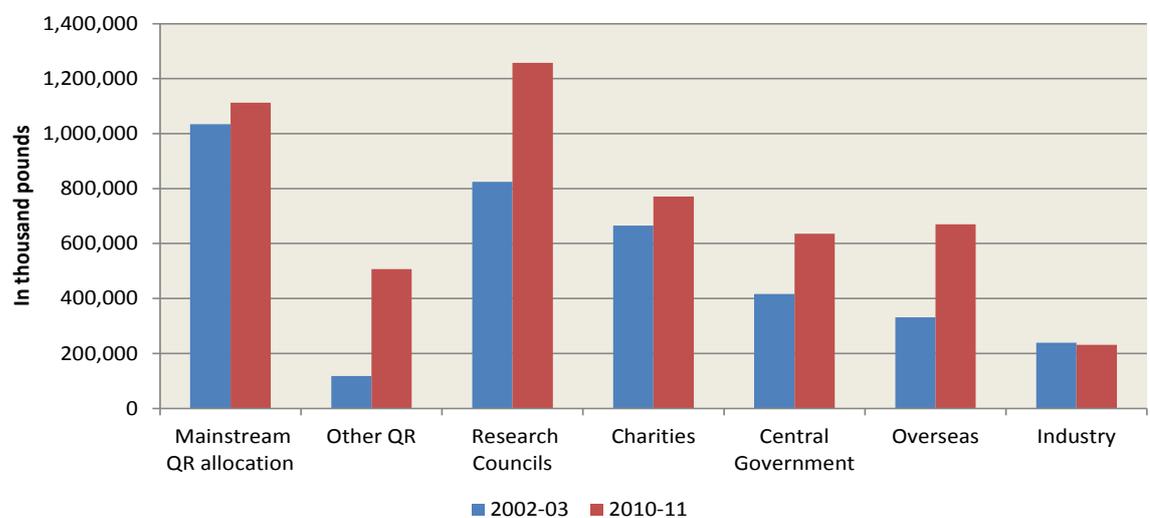
Figure 9.1 The funding of university research in England: Dual Support and other sources 2002/3 to 2010/11 (in 2012 prices)



Source: CBR calculations based on HESA financial statistics

9.2.2 The relative positions of the different sources of funding are shown in Figure 9.2. Here the relatively great change in Other QR and Research Councils along with Overseas and Central Government is shown in relation to the other sources of funding. It is noticeable that the weakest performer is in relation to Industry funding of university research which actually fell in real terms over the period as a whole.

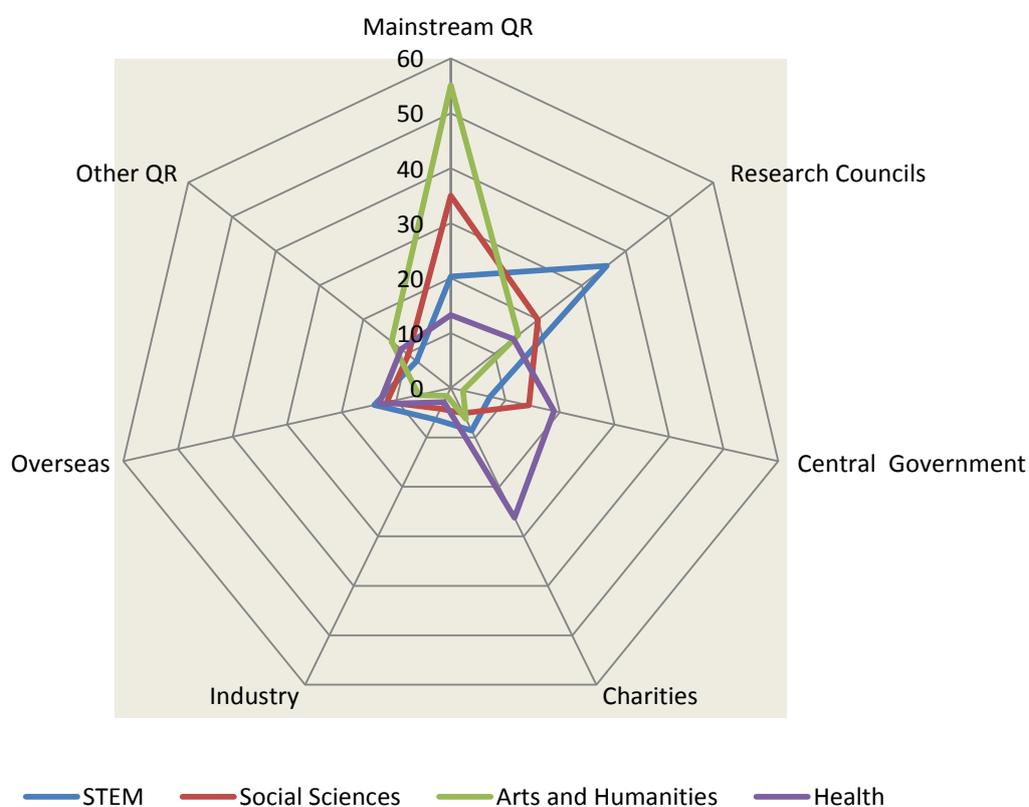
Figure 9.2 The Level and Distribution of Total University Research Income by Funding Source in 2002 - 3 and 2010 - 11 England (in 2012 prices)



Source: CBR calculations based on HESA Financial Statistics

9.2.3 The sources of university funding for research differ across discipline and subject group. This is illustrated in Figure 9.3. This spider diagram shows the percentage of total income derived from the research funding sources shown in Figure 9.1, disaggregated across four broad subject areas. It is clear that there are substantial differences between subject areas. Thus, STEM subjects are disproportionately funded through the Research Councils route. Health is relatively dominated by charitable sources of funding, while Social Sciences and, in particular, the Arts and Humanities are more dependent on Mainstream QR than are the other subject areas. The differences in terms of Other QR between the broad subject groupings are relatively small.

Figure 9.3 University funding sources in England by discipline 2010/11 (% of total income)



Source: CBR calculations based on HESA financial statistics

9.2.4 The implications of this analysis are that the growth of non-hypothecated income over time has become increasingly related to Other QR, rather than Mainstream QR. To the extent this implies the ability of universities to attract Industry and Charitable funding, then there is a feedback connection between the attraction of other sources of income from these domains and the total value of non-hypothecated resources available to a university. Secondly, it is clear that the potential role of QR is lowest in relation to STEM disciplines, relatively high in relation to the Social Sciences and of the greatest importance in relation to the Arts and Humanities.

9.2.5 The allocation of QR funding by broad subject groups shown in this figure is based on the data collected by HEFCE in relation to estimating mainstream QR and other QR elements awarded to universities. We are aware that these sums are allocated as a total overall and not in terms of the broad subject groupings we have identified. However, to the extent that the internal allocation processes which we examine in our case studies draw a relationship between the use of QR funding and the subject and Department areas which earn them suggests that there may well be a connection between the patterns observed in Figure 9.3 and the internal allocation of non-hypothecated QR funding.

9.3 The concentration of Third Stream income and research funding in the English university sector

9.3.1 So far we have examined the distribution of research income by broad subject group. An important feature of the distribution of both TSI and research income is that it is very unequally distributed across universities. In order to compare and contrast the concentration of TSI and research funding across universities, we constructed a set of tables which show the ranking and share of individual English universities in total TSI as a whole and seven sub-categories, specifically collaborative research, consultancy, contract research, intellectual property, facilities and equipment, regeneration and development and continuing professional development. For each year from 2003/4-2010/11 we calculated for each source of TSI the share of the top ranked 10% of universities in this particular category of income. In order to get some sense of the stability of these rankings over time we also calculated a non-parametric rank-correlation measure of the degree of similarity in rankings taking each year in the time series. This is known as the Kendall Coefficient of Concordance (W). We carried out a similar analysis for research funding, distinguishing between Research Council funding, charity funding, central government funding, industrial funding, overseas funding, mainstream QR funding, non-mainstream QR funding, total QR funding and all other sources of funding.

9.3.2 The results of this analysis are shown in Table 9.1 and Table 9.2. Table 9.1 shows that there is a substantial concentration of external income generated by English universities. Thus, the concentration in 2003 was highest in the intellectual property stream where the top 10% of universities accounted for nearly 84% of all the intellectual property earned. This was followed in that year by income from leasing facilities and equipment where the top 10% accounted for 72%. In general for each source of income there has been a tendency for the share of the top 10% of universities to decrease. The relative pattern of concentration across the sources of income has remained broadly the same. The values of Kendall's W are all statistically

significant at the 5% level. This means that there is considerable stability over time in the ranks of the leading 10% of universities.

Table 9.1 Share of leading 10% of universities' Departments in external income generation in English universities 2003-2010

| | | All | TOTAL Income £m |
|--|------|--------------|-----------------|
| Collaborative Research | 2003 | 62.0% | 480 |
| | 2010 | 43.1% | 637 |
| | W | 0.69 | |
| Consultancy | 2003 | 52.0% | 200 |
| | 2010 | 39.0% | 304 |
| | W | 0.59 | |
| Contract Research | 2003 | 66.4% | 596 |
| | 2010 | 62.1% | 908 |
| | W | 0.87 | |
| Intellectual Property | 2003 | 83.8% | 34 |
| | 2010 | 69.7% | 52 |
| | W | 0.64 | |
| Facilities & Equipment | 2003 | 72.0% | 71 |
| | 2010 | 40.7% | 109 |
| | W | 0.74 | |
| Regeneration & Development | 2003 | 51.2% | 197 |
| | 2010 | 26.0% | 155 |
| | W | 0.44 | |
| Continuing Professional Development | 2003 | 52.0% | 307 |
| | 2010 | 28.8% | 515 |
| | W | 0.86 | |
| Total External Income | 2003 | 46.4% | 1,885 |
| | 2010 | 43.1% | 2,679 |
| | W | 0.78 | |

Source: CBR Database Statistical Annex 1

9.3.3 Table 9.2 repeats the analysis for external funding sources and, in addition to providing an analysis for each funding stream as a whole, shows the concentration within four broad subject streams: STEM, Health, Social Sciences and the Arts and Humanities. As with TSI there is a substantial concentration of funding in the hands of the leading 10% of English universities. There is also considerable stability over time in the rankings and identity of the leading 10% of universities. Unlike the case of TSI, there is no general tendency for the level of concentration to decline over time and in some cases it shows signs of increasing.

Table 9.2 Share of leading 10% of universities' Departments in research funding in English universities 2002-2010

| | | All | STEM | HEALTH | SOCS CI | A&H | TOTAL Income £m |
|--------------------|------|-------|-------|--------|------------|-------|-----------------------|
| Research Council | 2002 | 66.5% | 68.3% | 82.7% | 60.4% | 53.0% | 824 |
| | 2010 | 66.6% | 67.4% | 84.9% | 55.9% | 50.3% | 1,257 |
| | W | 0.92 | 0.97 | 0.93 | 0.88 | 0.77 | |
| Charities | 2002 | 76.7% | 74.5% | 85.9% | 57.5% | 57.7% | 665 |
| | 2010 | 78.8% | 77.1% | 85.3% | 48.6% | 56.2% | 771 |
| | W | 0.93 | 0.92 | 0.95 | 0.55 | 0.60 | |
| Central Government | 2002 | 47.1% | 56.9% | 67.3% | 55.9% | 68.2% | 416 |
| | 2010 | 56.5% | 47.7% | 69.6% | 53.0% | 46.5% | 635 |
| | W | 0.76 | 0.76 | 0.80 | 0.75 | 0.61 | |
| Industry | 2002 | 67.0% | 67.8% | 81.6% | 66.6% | 90.6% | 239 |
| | 2010 | 58.9% | 57.7% | 76.1% | 33.3% | 51.5% | 232 |
| | W | 0.87 | 0.80 | 0.83 | 0.55 | 0.52 | |
| Overseas | 2002 | 61.6% | 61.6% | 84.8% | 52.4% | 70.7% | 332 |
| | 2010 | 67.1% | 63.0% | 88.1% | 58.4% | 41.2% | 670 |
| | W | 0.89 | 0.83 | 0.95 | 0.65 | 0.67 | |
| Other | 2002 | 64.1% | 77.5% | 83.0% | 69.1% | 84.7% | 49 |
| | 2010 | 31.6% | 45.3% | 65.7% | 35.4% | 31.0% | 32 |
| | W | 0.46 | 0.60 | 0.27 | 0.66 | 0.46 | |
| Mainstream QR | 2002 | 58.7% | 65.7% | 77.0% | 49.3% | 47.8% | 1,034 |
| | 2010 | 54.8% | 62.7% | 64.8% | 46.5% | 44.5% | 1,112 |
| | W | 0.91 | 0.99 | 0.96 | 0.85 | 0.93 | |
| Non-mainstream QR | 2002 | 56.5% | 61.6% | 75.4% | 49.2% | 54.7% | 118 |
| | 2010 | 62.5% | 61.7% | 77.7% | 42.8% | 47.0% | 507 |
| | W | 0.93 | 0.96 | 0.74 | 0.83 | 0.84 | |
| All QR | 2002 | 58.5% | 65.2% | 76.5% | 48.9% | 47.9% | 1,152 |
| | 2010 | 57.1% | 62.5% | 68.7% | 45.5% | 44.8% | 1,619 |
| | W | 0.94 | 0.99 | 0.94 | 0.87 | 0.94 | |

Source: CBR Database Statistical Annex 1

9.3.4 It is important to note that movements over time between the two years shown may be sensitive to a particular pattern of funding affecting one or two universities, so too much attention should not be paid to major reductions or increases between 2002 and 2010 without close inspection of the underlying data tables generating aggregate results in Table 9.2. A full set of all the annual distributions by the top 10% of universities is included in Statistical Annex 2.

9.3.5 The principal implications of the analysis in Table 9.1 and Table 9.2 is that in attempting to explain the relationship between, say, TSI generation and research

funding inputs, it is important to recognise the extreme skewness of the underlying distribution of the variables. This raises particular problems which will need to be addressed in our multiple regression analysis. These are discussed in detail below. The second implication is that a relatively small number of institutions play a critical role both in attracting external income and in utilising underlying funding sources.

9.4 Econometric analysis

- 9.4.1 In this section we analyse the relationship between total QR non-hypothecated funding and economic impact using econometric methods. This builds on the case study work reported in the previous chapters.
- 9.4.2 Our proxy for economic impact in this chapter is the willingness of external organisations to pay for a range of research related and commercialisation activities captured by TSI flows.
- 9.4.3 Our definition of TSI includes the full range of income sources reported in the HEBCIS surveys. Thus, for any year it represents the sum of funding received from Collaborative Research, Consultancy, Contract Research, Intellectual Property (including sales of shares), Use of Facilities and Equipment-related Services, Regeneration and Development Programmes, and Continuing Professional Development and Continuing Education. Our independent variables are the two central components of the Dual Support system: total QR non-hypothecated income and Research Council income.
- 9.4.4 The main purpose of our analysis is not to test models of the determinants of TSI. This would involve developing a model of the relationship between research funding and a wide variety of other variables which could affect the relationship. Rather our purpose is to identify as a first cut whether or not there is a relationship between non-hypothecated QR income and TSI and whether it can be identified separately from Research Council funding. One further factor which we felt nonetheless important to include was the “third” element of funding which complements the Dual Support system. This third stream funding in the form of the Higher Education Innovation Fund (HEIF) may be expected to have moderated the relationship between total QR and RC research funding and TSI.⁶
- 9.4.5 There are a number of conceptual and empirical difficulties which face any attempt to separate out the effects one component of the Dual Support system, such as non-hypothecated income from RC funding, when attempting to explain the factors

⁶ We did experiment with a wide range of other variables relating to HEI characteristics including the degree of concentration of research activity in an HEI, whether or not an HEI was a member of the Russell Group of universities, the extent to which the university employed specialist staff to develop private sector relationships, the importance of engineering and STEM subjects in the HEI’s overall research activity. These were rarely consistently statistically significant and are not reported here for reasons of space.

generating TSI. It is important to be aware of these in interpreting the results which follow.

- 9.4.6 The first conceptual problem is that, as we have seen from the qualitative analysis based on detailed case studies, the non-hypothecated QR funding component of the Dual Support system and the Research Council component have strong complementary characteristics. QR income is used to support strategic initiatives designed to enhance an institution's ability to raise its overall research capacity and to compete effectively for Research Council funding. Equally, Research Council funding itself produces the kinds of academic output which feature strongly in research assessment exercises and hence it influences QR funding. Attempting to isolate the effect of one from the other is therefore problematic.
- 9.4.7 Secondly, the interrelationship between the two components of the Dual Support system also leads to an econometric problem. As we have seen in our discussion of the overall structure of the UK funding system in this report, there is a high degree of correlation across universities between Research Council funding and QR funding. Even if we wished to regard the two elements of the Dual Support stream as substitutes, then when we run multiple regression analyses in which we attempt to include QR funding and Research Council funding in the same equation, the estimates will suffer from multicollinearity. It is important therefore that where we do attempt to include RC funding and TQR funding in the same multiple regression analysis, that we identify the extent of multicollinearity.
- 9.4.8 The presence of multicollinearity produces a tendency for the estimated coefficients in a regression to be less statistically significant than they would be in the absence of multicollinearity. We are unlikely therefore to get statistically significant results when problems of multicollinearity arise, so we cannot make reliable statements about the effect of individual independent variables.⁷
- 9.4.9 We deal with multicollinearity by reporting variance inflation factors (VIF). These provide an indication of the extent of the problem and whether our results are likely to be affected by it.⁸
- 9.4.10 Thirdly, there are important issues connected with time lags in estimating the relationship between both QR and RC funding and outcomes in terms of TSI. In the analysis which we carry out we consider the impact of QR and RC income received in the period 2002/3 and 2006/7 with TSI generated in the period 2007/8 to 2011/12. This allows for potential time lags between the receipt of QR and RC income, its conversion into research outputs, such as publications and other outputs, and the

⁷ See for example Gujarati (2004).

⁸ See for example O'Brien (2007) for a discussion of the use and misuse of VIF calculations. A particular multicollinearity problem arises when a variable is included along with a higher order term of the same variable, e.g. a squared term. The result is that variance inflation factors will be very high in such equations. It is possible to adjust for this "artificial" effect by estimating the models in such a way that this artificial source of multicollinearity is removed. We do this where appropriate and report the adjusted VIF in brackets.

attraction of TSI related to those outputs. We do not, however, lag HEIF funding on the grounds that its effect is likely to be more contemporaneous.

- 9.4.11 A further econometric problem arises from the fact that the data on TSI and research funding are, as we saw in the opening chapters of this report, highly skewed. A few institutions dominate QR and RC funding and TSI. To correct for this problem, we transform the underlying data into logarithms which reduces the skewness of the distributions and makes the normality assumptions underlying ordinary least squares (OLS) regression analyses more reasonable.
- 9.4.12 In addition to skewness, the underlying set of relationships between RC and QR is characterised by a number of outliers which could bias the results. In addition to OLS, therefore, we employ a robust regression approach as a check on our results. This adjusts for the potential difficulty of the presence of outliers in the sample.⁹
- 9.4.13 A further consideration in estimating the relationship between RC and QR income on the one hand and TSI on the other is that there are a number of English HEIs which in the course of the period of our analysis received no income from one or either source. We have excluded the small number of organisations affected.¹⁰
- 9.4.14 Finally, there are substantial differences in the scale of universities within the English HEI sector and hence in the extent to which they receive QR and RC research funding and TSI. We therefore normalise all our income and research funding variables by the number of full-time equivalent staff in each HEI in the UK.¹¹
- 9.4.15 We can now turn to the presentation and analysis of the underlying core results. A full set of the many alternative models that we estimated is contained in Statistical Annex 2.¹²

⁹ Robust regression methods provide unbiased estimates that are unaffected by outliers or skewed residual distributions. See for example Wilcox (1997) pp 207-237 and Andersen, R. (2008), *Modern Methods for Robust Regression*, SAGE.

Robust MM-estimators for linear regression models as described by Yohai (1987) were employed for the purposes of this analysis.

¹⁰ An alternative would have been to have included them and attributed to them an arbitrarily small sum, such as £1. We chose not to do this since this introduces into the dataset a cluster of points at one extreme of the distribution with similar values, which may potentially bias the results.

¹¹ In addition to regressions including HEIF expenditure per Head we also experimented with the inclusion of HEIF income in absolute terms. Results based on these estimations are also included in the Statistical Annex 2. There is, however, no obvious conceptual justification for including the absolute level of HEIF funding in a regression where all other variables are normalised and where spend per Head seems more appropriate and these results are therefore not reported in this chapter.

¹² This annex includes a full set of underlying data concerning the characteristics of the data and the correlation matrix showing the interrelationship between the variables. It also includes additional regression estimates to those run here which do not add significantly to the analysis of this chapter.

The sample and dataset analysed

- 9.4.16 The full details of the sample of 107 HEIs covered in the analysis along with key descriptive variables of the sample and a full set of all regression results are presented in Statistical Annex 2. We focus here on the main findings of an analysis of lagged effects. We present OLS and robust regressions and results with and without HEIF variables.
- 9.4.17 Table 9.3 sets out the key variables used in the analysis and their definitions.

Table 9.3 **Definitions and variables**

| Variable | Definition |
|---------------------------------|--|
| HEI ID | HESA Institution Identifier |
| HEI Name | Higher Education Institution |
| TSI (2007/08 to 2011/12) | Third Stream Income ¹³ |
| TSI (2003/04 to 2006/07) | Third Stream Income |
| TQR (2002/03 to 2006/07) | Total Quality-Related Research Income ¹⁴ |
| TQR (2007/08 to 2011/12) | Total Quality-Related Research Income |
| RC (2002/03 to 2006/07) | Research Council Income |
| HEIF (2007/08 to 2011/12) | Higher Education Innovation Fund |
| FTE (2007/08 to 2011/12) | Academic Staff Full-Time Equivalent ¹⁵ |
| FTE (2002/03 to 2006/07) | Academic Staff Full-Time Equivalent |
| FTE (2003/04 to 2006/07) | Academic Staff Full-Time Equivalent |
| TSI/FTE (2007/08 to 2011/12) | Third Stream Income per capita |
| TSI/FTE (2003/04 to 2006/07) | Third Stream Income per capita |
| TQR/FTE (2002/03 to 2006/07) | Total Quality-Related Research Income per capita |
| RC/FTE (2002/03 to 2006/07) | Research Council Income per capita |
| HEIF/FTE (2007/08 to 2011/12) | Higher Education Innovation Fund per capita |
| TQR+RC/FTE (2002/03 to 2006/07) | Sum of Total Quality-Related Research Income and Research Council Income per capita |
| TQR/TQR+RC (2002/03 to 2006/07) | Ratio of Total Quality-Related Research Income to the sum of Total Quality-Related Research Income and Research Council Income |

¹³ Third Stream Income (TSI) is defined as the sum of seven external income generation sources: collaborative research, consultancy, contract research, intellectual property (including sales of shares), facilities and equipment-related services, regeneration and development programmes, and continuing professional development and continuing education.

¹⁴ Total QR (TQR) is defined as the sum of mainstream QR allocation, RDP supervision allocation rate of funding per London-we, allocation for London extra costs, charity support funding, RDP supervision allocation, and the business research element.

¹⁵ Academic staff Full-Time Equivalent (FTE) is defined by HESA as “the proportion of a full-time year being undertaken over the course of the reporting period 1 August to 31 July.” (Source: http://www.hesa.ac.uk/index.php?option=com_datatables&task=show_file&defs=1&Itemid=121&catdex=2&dfile=staffdefs0910.htm)

9.4.18 Table 9.4 sets out in formal terms the regression models which are estimated and presented in this chapter. They are numbered Models 1.1 to 1.9. Model 1.5 is not presented here, although it is presented in the Appendix, because the results did not add significantly to our interpretation.

Table 9.4 Regression models:

Models excluding $\log\left(\frac{HEIF}{FTE}\right)_t$

Model 1.1:

$$\log\left(\frac{TSI}{FTE}\right)_t = \alpha + \beta_1 \cdot \log\left(\frac{TSI}{FTE}\right)_{t-1} + \beta_2 \cdot \log\left(\frac{TQR}{FTE}\right)_{t-1}$$

Model 1.2:

$$\log\left(\frac{TSI}{FTE}\right)_t = \alpha + \beta_1 \cdot \log\left(\frac{TSI}{FTE}\right)_{t-1} + \beta_2 \cdot \log\left(\frac{TQR}{FTE}\right)_{t-1} + \beta_3 \cdot \log\left(\frac{TQR}{FTE}\right)_{t-1}^2$$

Model 1.3:

$$\log\left(\frac{TSI}{FTE}\right)_t = \alpha + \beta_1 \cdot \log\left(\frac{TSI}{FTE}\right)_{t-1} + \beta_2 \cdot \log\left(\frac{RC}{FTE}\right)_{t-1}$$

Model 1.4:

$$\log\left(\frac{TSI}{FTE}\right)_t = \alpha + \beta_1 \cdot \log\left(\frac{TSI}{FTE}\right)_{t-1} + \beta_2 \cdot \log\left(\frac{RC}{FTE}\right)_{t-1} + \beta_3 \cdot \log\left(\frac{RC}{FTE}\right)_{t-1}^2$$

Model 1.6:

$$\log\left(\frac{TSI}{FTE}\right)_t = \alpha + \beta_1 \cdot \log\left(\frac{TSI}{FTE}\right)_{t-1} + \beta_2 \cdot \log\left(\frac{TQR}{FTE}\right)_{t-1} + \beta_3 \cdot \log\left(\frac{TQR}{FTE}\right)_{t-1}^2 + \beta_4 \cdot \log\left(\frac{RC}{FTE}\right)_{t-1}$$

Model 1.7:

$$\log\left(\frac{TSI}{FTE}\right)_t = \alpha + \beta_1 \cdot \log\left(\frac{TSI}{FTE}\right)_{t-1} + \beta_2 \cdot \log\left(\frac{TQR}{FTE}\right)_{t-1} + \beta_3 \cdot \log\left(\frac{TQR}{FTE}\right)_{t-1}^2 + \beta_4 \cdot \log\left(\frac{RC}{FTE}\right)_{t-1} + \beta_5 \cdot \log\left(\frac{RC}{FTE}\right)_{t-1}^2$$

Model 1.8:

$$\log\left(\frac{TSI}{FTE}\right)_t = \alpha + \beta_1 \cdot \log\left(\frac{TSI}{FTE}\right)_{t-1} + \beta_2 \cdot \log\left(\frac{TQR + RC}{FTE}\right)_{t-1}$$

Model 1.9:

$$\log\left(\frac{TSI}{FTE}\right)_t = \alpha + \beta_1 \cdot \log\left(\frac{TSI}{FTE}\right)_{t-1} + \beta_2 \cdot \log\left(\frac{TQR + RC}{FTE}\right)_{t-1} + \beta_3 \cdot \log\left(\frac{TQR + RC}{FTE}\right)_{t-1}^2$$

9.4.19 The first model is a simple estimation of the relationship between TSI per head and lagged TSI per head and lagged total QR per head. Model 1.2 adds to this specification a quadratic term which allows for the possibility that the relationship between total QR per head and TSI may be non-linear. Models 1.3 and 1.4 are the same as 1.1 and 1.2 except that they replace the total QR variables by RC per head and RC per head squared respectively. In Model 1.6 we attempt to include both the total QR and RC variables. This uses the quadratic estimation for TQR, but excludes the quadratic term for RC. This latter variable is then included in Model 1.7. Finally, Models 1.8 and 1.9 estimate the relationship between TSI per head and combined total QR and RC income per head. Model 1.9 differs from Model 1.8 in including a squared term for total QR plus RC per head.

Analysis and interpretation of results

- 9.4.20 Table 9.5 provides estimates of the equations represented in Models 1.1 through 1.9 using OLS estimation techniques. For each estimated equation the table shows \bar{R}^2 , the number of HEIs in the estimation and the statistical significance of the estimated coefficients. Three stars indicates the coefficient is statistically significant at the 1% level, two stars indicates significance at the 5% level and one star represents significance at the 10% level.
- 9.4.21 Below each estimated equation we present the VIF. The VIF values are also corrected to remove the effect of the inclusion of a quadratic term in an equation. The corrected VIF is based on a re-estimated equation where the values of $\left(\frac{TQR}{FTE}\right)_{t-1}$, $\left(\frac{RC}{FTE}\right)_{t-1}$ and $\left(\frac{TQR+RC}{FTE}\right)_{t-1}$ are centred around their mean. These adjusted VIF factors are shown in brackets below the uncorrected values.
- 9.4.22 Each of the equations was tested to see if the standard errors were affected by heteroscedasticity. None of the equations were affected.
- 9.4.23 In all of the estimated models the lagged value of $\left(\frac{TSI}{FTE}\right)$ is highly statistically significant and relatively stable. It is clear that there is a strong relationship over time between past success in raising TSI and future success in raising TSI. However, the coefficient is less than 1 which implies some regression to the mean. In other words, HEIs with high TSI per head in one period are likely to have somewhat lower TSI per head in the next and vice versa for those with lower TSI per head.
- 9.4.24 Models 1.1 and 1.2 show that there is a positive correlation between lagged total QR funding per head and TSI per head. The relationship is non-linear and in Model 1.2 the estimated coefficient shows that there is a U-shaped relationship between lagged total QR per head and TSI per head. Thus for low levels of total QR, additional total QR is associated with declining TSI, but at higher levels of total QR the relationship is positive.
- 9.4.25 Models 1.3 and 1.4 show that there is a similar relationship between TSI and RC funding, although in this case the coefficient on lagged RC funding in the quadratic equation is not statistically significant.
- 9.4.26 Models 1.6 and 1.7 include both total QR per head and RC per head in a linear and in a non-linear form. It is clear that there are some problems of multicollinearity. This is reflected in the high values of the VIFs even when these are adjusted to allow for the impact of quadratic terms in the equation. The estimated coefficients on the total QR per head and RC per head variables are similar to the estimated values when total QR and RC are entered in separate equations. Their statistical significance is, however, reduced, because of inflation of the variances due to multicollinearity.

Table 9.5 OLS regression results: effect on TSI per head of lagged total QR per head and RC per head

| | Model 1.1 | Model 1.2 | Model 1.3 | Model 1.4 | Model 1.6 | Model 1.7 | Model 1.8 | Model 1.9 |
|---|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| (Intercept) | 3.065*** (0.41) | 4.280*** (0.567) | 3.263*** (0.407) | 4.395*** (0.695) | 4.189*** (0.575) | 4.384*** (0.699) | 3.017*** (0.404) | 4.924*** (0.769) |
| $\log(\text{TSI}/\text{FTE})_{t-1}$ | 0.631*** (0.048) | 0.613*** (0.046) | 0.595*** (0.049) | 0.595*** (0.049) | 0.598*** (0.049) | 0.598*** (0.049) | 0.618*** (0.048) | 0.603*** (0.046) |
| $\log(\text{TQR}/\text{FTE})_{t-1}$ | 0.073*** (0.021) | -0.249** (0.109) | | | -0.238** (0.11) | -0.175 (0.168) | | |
| $\log(\text{TQR}/\text{FTE})^2_{t-1}$ | | 0.023*** (0.008) | | | 0.019** (0.008) | 0.014 (0.013) | | |
| $\log(\text{RC}/\text{FTE})_{t-1}$ | | | 0.098*** (0.023) | -0.234 (0.168) | 0.053 (0.055) | -0.066 (0.248) | | |
| $\log(\text{RC}/\text{FTE})^2_{t-1}$ | | | | 0.023** (0.011) | | 0.009 (0.018) | | |
| $\log((\text{TQR}+\text{RC})/\text{FTE})_{t-1}$ | | | | | | | 0.089*** (0.022) | -0.375** (0.163) |
| $\log((\text{TQR}+\text{RC})/\text{FTE})^2_{t-1}$ | | | | | | | | 0.029*** (0.01) |
| \bar{R}^2 | 0.73 | 0.75 | 0.742 | 0.749 | 0.749 | 0.748 | 0.737 | 0.754 |
| N | 107 |
| VIF¹⁶ | | | | | | | | |
| $\log(\text{TSI}/\text{FTE})_{t-1}$ | 1.25 | 1.27 | 1.41 | 1.41 | 1.43 | 1.43 | 1.29 | 1.30 |
| $\log(\text{TQR}/\text{FTE})_{t-1}$ | 1.25 | 38.13 (1.94) | | | 38.58 (9.68) | 89.01 (11.68) | | |
| $\log(\text{TQR}/\text{FTE})^2_{t-1}$ | | 38.71 (1.61) | | | 48.36 (2.01) | 107.24 (4.45) | | |
| $\log(\text{RC}/\text{FTE})_{t-1}$ | | | 1.41 | 75.55 (1.54) | 8.05 (8.05) | 163.16 (9.55) | | |
| $\log(\text{RC}/\text{FTE})^2_{t-1}$ | | | | 75.14 (1.13) | | 174.56 (2.63) | | |
| $\log((\text{TQR}+\text{RC})/\text{FTE})_{t-1}$ | | | | | | | 1.29 | 72.06 (1.69) |
| $\log((\text{TQR}+\text{RC})/\text{FTE})^2_{t-1}$ | | | | | | | | 72.85 (1.35) |

¹⁶ VIF corrected to remove effect of inclusion of the quadratic term. The equation is re-estimated by using values of $(\text{TQR}/\text{FTE})_{t-1}$, $(\text{RC}/\text{FTE})_{t-1}$ and $(\text{TQR}+\text{RC}/\text{FTE})_{t-1}$ centered around their mean. In Table 9.5 the VIF varies between 2 and 11.6. A VIF of 10, for example, indicates that other things being equal the variance of the affected regression coefficient is ten times greater than it would have been if that independent variable had been linearly independent of the other variables in the regression. There is no absolute level of the VIF which can be used to say that the equation is suffering from "too much" multicollinearity. More conservative authors regard values of less than 2 as appropriate indicators that the equation is not seriously suffering from multicollinearity whereas others use higher cut-offs. See the discussion in O'Brien (2007). All of the estimated equations in Table 9.5 2 except Models 1.6 and 1.7 satisfy the more stringent requirement of being less than 2.

9.4.27 In each case the equations in Table 9.5 explain a relatively high proportion of the variance in TSI per head, the value of \bar{R}^2 varies between 0.73 and 0.75.

9.4.28 To test for the presence of outliers and their potential impact on the regression estimates, we repeated the analyses of the models in Table 9.5 using robust regression techniques. The results are shown in Table 9.6. The results are very similar to those shown in Table 9.5. The pattern of significance and the size of the estimated coefficients are very stable. The results are therefore robust to the effects of extreme outliers.

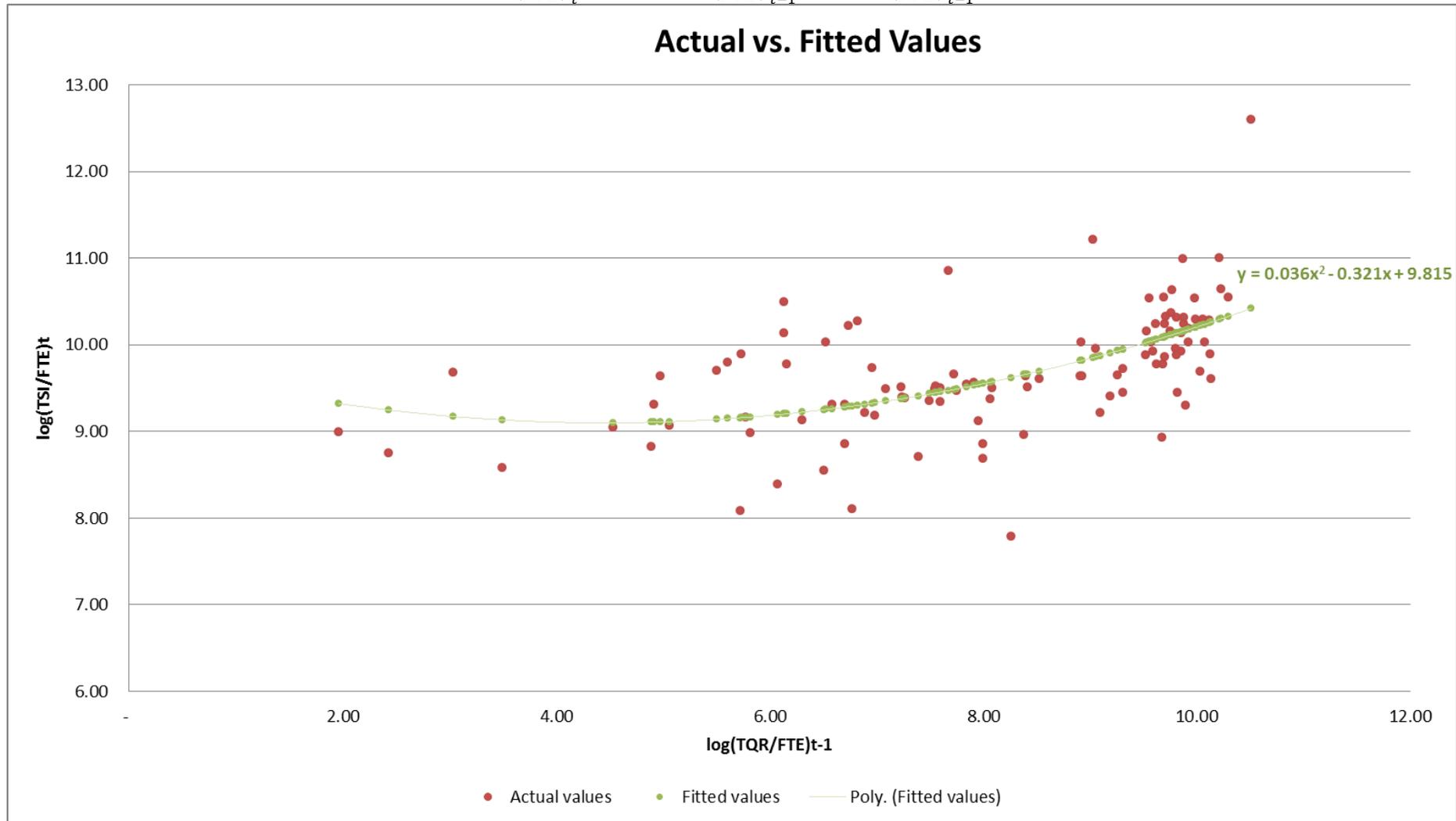
Table 9.6 Robust regression results: effects on TSI per head, lagged total QR per head and RC per head

| | Model r1.1 | Model r1.2 | Model r1.3 | Model r1.4 | Model r1.6 | Model r1.7 | Model r1.8 | Model r1.9 |
|---|---------------------|----------------------|---------------------|---------------------|----------------------|---------------------|---------------------|----------------------|
| (Intercept) | 3.253*** (0.803) | 4.662*** (0.875) | 3.743*** (0.807) | 4.829*** (0.808) | 4.659*** (0.912) | 4.825*** (0.913) | 3.269*** (0.734) | 5.370*** (0.892) |
| log(TSI/FTE) _{t-1} | 0.606*** (0.087) | 0.578*** (0.087) | 0.531*** (0.093) | 0.537*** (0.087) | 0.542*** (0.103) | 0.533*** (0.097) | 0.581*** (0.081) | 0.557*** (0.088) |
| log(TQR/FTE) _{t-1} | 0.080*** (0.02) | -0.285*** (0.104) | | | -0.272*** (0.098) | -0.235 (0.202) | | |
| log(TQR/FTE) ² _{t-1} | | 0.026*** (0.007) | | | 0.021*** (0.007) | 0.018 (0.013) | | |
| log(RC/FTE) _{t-1} | | | 0.115*** (0.024) | -0.220** (0.103) | 0.083 (0.054) | 0.018 (0.266) | | |
| log(RC/FTE) ² _{t-1} | | | | 0.023*** (0.007) | | 0.005 (0.017) | | |
| log((TQR+RC)/FTE) _{t-1} | | | | | | | 0.100*** (0.023) | -0.401*** (0.122) |
| log((TQR+RC)/FTE) ² _{t-1} | | | | | | | | 0.032*** (0.008) |
| Residual Std. Error | 0.307 (df = 104) | 0.282 (df = 103) | 0.287 (df = 104) | 0.290 (df = 103) | 0.282 (df = 102) | 0.269 (df = 101) | 0.300 (df = 104) | 0.281 (df = 103) |
| N | 107 | 107 | 107 | 107 | 107 | 107 | 107 | 107 |

9.4.29 We can conclude that there is a non-linear relationship between total QR per head and TSI per head and that this is also true for RC per head. Total QR funding is therefore strongly correlated with TSI and except at lower levels of total QR has a highly significant positive effect on the generation of TSI in subsequent periods. This is also true when total QR and RC are combined as in Models 1.8 and 1.9. To illustrate this Figure 1.2 shows predicted values of TSI per head against lagged total QR per head. The fitted curve shown is based on a simple OLS regression of TSI per head against total QR per head excluding lagged TSI. The non-linearity is clear.

Figure 9.4 TSI per head: actual vs. fitted Values

$$\log\left(\frac{TSI}{FTE}\right)_t = \alpha + \beta_1 \cdot \log\left(\frac{TQR}{FTE}\right)_{t-1} + \beta_2 \cdot \log\left(\frac{TQR}{FTE}\right)_{t-1}^2$$



Economic significance

9.4.30 So far we have focused on an analysis of statistical significance. Table 9.7 presents an analysis of economic significance. It focuses on the magnitude of the responsiveness of TSI per head in terms of changes in lagged total QR per head. The table is based on the estimated equation of Model 1.2 in Table 1.3.

Table 9.7 Effects of changes in $(TQR/FTE)_{t-1}$ on $(TSI/FTE)_t$

| | % Increase in $(TQR/FTE)_{t-1}$ | | | % Increase in $(TSI/FTE)_t$ |
|----------------|---------------------------------|-------|-------|-----------------------------|
| | 1% | 5% | 10% | |
| Upper quartile | 0.20% | 0.99% | 1.95% | |
| Median | 0.14% | 0.68% | 1.34% | |
| Lower quartile | 0.06% | 0.32% | 0.63% | |

9.4.31 Table 9.7 shows that for a HEI at the upper quartile of total QR per head a 1% increase in total QR funding per head produces a 0.25% increase in TSI per head, while a 10% increase produces a 1.95% increase. As our regression model suggests, the effects are lower for HEIs at the lower quartile of total QR per head.

Third Stream Funding

9.4.32 To analyse the effect of third stream funding as a possible moderating factor on the impact on TSI per head of lagged total QR per head and RC per head, we re-estimated the models analysed in Table 9.5 and Table 9.6. The focus in Table 9.8 and Table 9.9 is on the core models which emerged from the discussion of the results shown in Table 9.4. In each case we add to the equations which were estimated in Table 9.4 and Table 9.5 the logarithm of contemporaneous HEIF per head. In each of the equations estimated using the OLS estimation technique, the sign on the third stream funding variable is positive, but is only statistically significant in relation to models in which RC funding is included as a separate variable. However, this result appears to be subject to the influence of some outliers since Table 9.9 shows that using robust estimation techniques the HEIF per head variable remains positive in all the estimations, but is statistically significantly both when RC variables are entered on their own and when they are entered directly alongside the total QR variables (as in Model r2.7 in column 3 of the table) as well as when combined total QR and RC per head is used (as in Model r2.9). It appears therefore that HEIF funding has an overall positive effect in enhancing the role that lagged total QR per head and RC per head plays in generating TSI.

Table 9.8 OLS estimations including $\log\left(\frac{HEIF}{FTE}\right)_t$

| | Model 2.2 | Model 2.4 | Model 2.7 | Model 2.9 |
|---|---------------------|---------------------|---------------------|---------------------|
| (Intercept) | 3.874*** (0.599) | 3.798*** (0.747) | 3.83*** (0.762) | 4.437*** (0.832) |
| $\log(\text{TSI}/\text{FTE})_{t-1}$ | 0.599*** (0.048) | 0.559*** (0.051) | 0.563*** (0.053) | 0.581*** (0.048) |
| $\log(\text{TQR}/\text{FTE})_{t-1}$ | -0.254** (0.109) | | -0.111 (0.17) | |
| $\log(\text{TQR}/\text{FTE})^2_{t-1}$ | 0.023*** (0.008) | | 0.008 (0.013) | |
| $\log(\text{RC}/\text{FTE})_{t-1}$ | | -0.273 (0.167) | -0.156 (0.251) | |
| $\log(\text{RC}/\text{FTE})^2_{t-1}$ | | 0.027** (0.011) | 0.018 (0.018) | |
| $\log((\text{TQR}+\text{RC})/\text{FTE})_{t-1}$ | | | | -0.393** (0.162) |
| $\log((\text{TQR}+\text{RC})/\text{FTE})^2_{t-1}$ | | | | 0.031*** (0.01) |
| $\log(\text{HEIF}/\text{FTE})_t$ | 0.075 (0.068) | 0.141** (0.07) | 0.129* (0.075) | 0.101 (0.068) |
| \bar{R}^2 | 0.75 | 0.756 | 0.753 | 0.757 |
| N | 107 | 107 | 107 | 107 |
| VIF ¹⁷ | | | | |
| $\log(\text{TSI}/\text{FTE})_{t-1}$ | 1.37 | 1.60 | 1.67 | 1.43 |
| $\log(\text{TQR}/\text{FTE})_{t-1}$ | 38.19 (2.06) | | 93.44 (12.81) | |
| $\log(\text{TQR}/\text{FTE})^2_{t-1}$ | 38.98 (1.62) | | 115.38 (4.79) | |
| $\log(\text{RC}/\text{FTE})_{t-1}$ | | 76.60 (1.81) | 170.43 (15.51) | |
| $\log(\text{RC}/\text{FTE})^2_{t-1}$ | | 77.39 (1.17) | 190.22 (2.86) | |
| $\log((\text{TQR}+\text{RC})/\text{FTE})_{t-1}$ | | | | 72.44 (1.86) |
| $\log((\text{TQR}+\text{RC})/\text{FTE})^2_{t-1}$ | | | | 73.77 (1.36) |
| $\log(\text{HEIF}/\text{FTE})_t$ | 1.10 | 1.22 | 1.34 | 1.13 |

Source:

¹⁷ VIF corrected to remove effect of inclusion of the quadratic term. The equation is re-estimated by using values of $\log(\text{TQR}/\text{FTE})_{t-1}$, $\log(\text{RC}/\text{FTE})_{t-1}$ and $\log((\text{TQR}+\text{RC})/\text{FTE})_{t-1}$ centered around their mean.

Table 9.9 Robust estimations including $\log\left(\frac{HEIF}{FTE}\right)_t$

| | Model r2.2 | Model r2.4 | Model r2.7 | Model r2.9 |
|------------------------------|----------------------|----------------------|---------------------|---------------------|
| (Intercept) | 4.146*** (0.94) | 4.026*** (0.773) | 4.092*** (0.896) | 4.751*** (0.878) |
| $\log(TSI/FTE)_{t-1}$ | 0.576*** (0.07) | 0.526*** (0.068) | 0.524*** (0.072) | 0.551*** (0.066) |
| $\log(TQR/FTE)_{t-1}$ | -0.298*** (0.101) | | -0.171 (0.18) | |
| $\log(TQR/FTE)_{t-1}^2$ | 0.027*** (0.007) | | 0.013 (0.012) | |
| $\log(RC/FTE)_{t-1}$ | | -0.308*** (0.113) | -0.121 (0.265) | |
| $\log(RC/FTE)_{t-1}^2$ | | 0.030*** (0.008) | 0.017 (0.018) | |
| $\log((TQR+RC)/FTE)_{t-1}$ | | | | -0.446*** (0.13) |
| $\log((TQR+RC)/FTE)_{t-1}^2$ | | | | 0.035*** (0.008) |
| $\log(HEIF/FTE)_t$ | 0.079 (0.071) | 0.160** (0.073) | 0.143* (0.081) | 0.113* (0.068) |
| Residual Std. Error | 0.286 (df = 102) | 0.292 (df = 102) | 0.265 (df = 100) | 0.282 (df = 102) |
| N | 107 | 107 | 107 | 107 |

Supporting interpretive evidence

9.4.33 The main finding of the regression analysis, that there is a significant positive effect of non-hypothecated total QR income on TSI, are consistent with results arising from a different approach which focuses on the motivations and pathways that impact the activities of academics. Thus in an analysis of impact pathways of UK academics in all Departments in all universities (Hughes et al., 2013) academics were classified by the scores received in the Research Assessment Exercise (RAE) of 2008. Departments were classified into three groups based on the proportion of their outputs which were rated in the highest four star category. The lowest group had 0-9% in this category, the middle ranked Departments had 10-19% and the highest ranked Departments had 20% or over of their submissions rated as four star. This analysis showed inter alia that academics in the most highly rated RAE Departments were more likely to report that they were motivated to carry out basic or user-inspired basic research than were academics in the lower ranked Departments. Even so, 25% of those in the most highly ranked Departments considered that their research was motivated by applications per se. The extent of their involvement in application and user-inspired basic research is also reflected in the fact that there is very little difference across Departments ranked in the lower and higher categories in the

extent to which the research which had been carried out had been applied in a private, commercial or public context or was perceived to be of commercial relevance. The analysis also showed that in the science Departments in particular, patenting, licensing and spin-out activity were more prevalent in highly rated Departments in the 2008 RAE. Moreover, taking all disciplines together, pathways involving academics with external organisations via joint research, joint publication and membership of research consortia were all more frequently cited by academics in the more highly rated Departments. These results are consistent with the econometric results in suggesting that there is a complementary relationship between conducting research in highly rated Departments in terms of the RAE. The relationship between research excellence and the ability to attract TSI and interact with external organisations is a complementary one.

9.5 Conclusions

- 9.5.1 There is a positive relationship between non-hypothecated income measured by total QR funding and the generation of TSI in a subsequent period. This result is both statistically and economically significant. The relationship is a non-linear one with the biggest effects occurring at the higher levels of total QR income per head. There is a similar positive and statistically significant relationship with RC income. The degree of multicollinearity between RC and total QR funding means that it is difficult to disentangle their separate effects. This is not simply an econometric problem, but also arises from the complementary nature of these two forms of funding for research. This complementarity is reflected in the detailed case studies which were represented in the earlier chapters in this report. The analysis also shows that the effect of third stream funding is positive when we consider combined RC and total QR funding streams and also when we consider models with RC funding on its own. The results that have been presented are robust to the presence of extreme outliers. They are also consistent with separate studies using different data indicating the extent to which individual academics in highly rated Departments have high levels of involvement with external impact pathways. This includes those which generate external income and would be captured in the TSI variables which are used in this chapter to represent the willingness to pay of external organisations and therefore serve as proxies for the impact of non-hypothecated and other public research support funding streams.

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Appendix B HEI Clusters

Table B1.1 Clusters of HEIs – Top Six research and high research HEIs

| Top Six research intensity cluster | | High research intensity cluster 1 | |
|------------------------------------|---------------------------|-----------------------------------|--|
| HESA code | HEI name | HESA code | HEI name |
| H-0132 | Imperial College London | H-0002 | Cranfield University |
| H-0134 | King's College London | H-0133 | Institute of Education |
| H-0149 | University College London | H-0138 | London School of Hygiene and Tropical Medicine |
| H-0114 | University of Cambridge | H-0110 | University of Birmingham |
| H-0204 | University of Manchester | H-0159 | University of Sheffield |
| H-0156 | University of Oxford | H-0160 | University of Southampton |
| | | High research intensity cluster 2 | |
| | | H-0121 | Keele University |
| | | H-0188 | Institute of Cancer Research |
| | | H-0123 | Lancaster University |
| | | H-0135 | London Business School |
| | | H-0137 | London School of Economics and Political Science |
| | | H-0152 | Loughborough University |
| | | H-0139 | Queen Mary, University of London |
| | | H-0141 | Royal Holloway, University of London |
| | | H-0143 | Royal Veterinary College |
| | | H-0147 | School of Pharmacy |
| | | H-0145 | St George's Hospital Medical School |
| | | H-0109 | University of Bath |
| | | H-0112 | University of Bristol |
| | | H-0116 | University of Durham |
| | | H-0117 | University of East Anglia |
| | | H-0118 | University of Essex |
| | | H-0119 | University of Exeter |
| | | H-0122 | University of Kent |
| | | H-0124 | University of Leeds |
| | | H-0125 | University of Leicester |
| | | H-0126 | University of Liverpool |
| | | H-0154 | University of Newcastle upon Tyne |
| | | H-0155 | University of Nottingham |
| | | H-0157 | University of Reading |
| | | H-0161 | University of Surrey |
| | | H-0162 | University of Sussex |
| | | H-0163 | University of Warwick |
| | | H-0164 | University of York |

Source: PACEC/CBR analysis

Table B1.2 Clusters of HEIs – medium research and low research HEIs

| Medium research intensity cluster 1 | | Low research intensity cluster 1 | |
|-------------------------------------|--|----------------------------------|---|
| HESA code | HEI name | HESA code | HEI name |
| H-0113 | Brunel University | H-0007 | Bishop Grosseteste University College, Lincoln |
| H-0072 | Oxford Brookes University | H-0048 | Bath Spa University |
| H-0146 | School of Oriental and African Studies | H-0064 | Leeds Metropolitan University |
| H-0060 | University of Hertfordshire | H-0023 | Liverpool Hope University |
| H-0073 | University of Plymouth | H-0038 | University of Cumbria |
| H-0078 | University of Sunderland | H-0057 | University of Derby |
| | | H-0062 | University of Lincoln |
| | | H-0189 | Writtle College |
| Medium research intensity cluster 2 | | Low research intensity cluster 2 | |
| H-0047 | Anglia Ruskin University | H-0052 | Birmingham City University |
| H-0108 | Aston University | H-0050 | Bournemouth University |
| H-0127 | Birkbeck College | H-0009 | Buckinghamshire New University |
| H-0115 | City University, London | H-0012 | Canterbury Christ Church University |
| H-0056 | Coventry University | H-0016 | Edge Hill University |
| H-0068 | De Montfort University | H-0018 | Harper Adams University College |
| H-0131 | Goldsmiths College, University of London | H-0063 | Kingston University |
| H-0065 | Liverpool John Moores University | H-0040 | Leeds Trinity and All Saints |
| H-0076 | London South Bank University | H-0202 | London Metropolitan University |
| H-0066 | Manchester Metropolitan University | H-0067 | Middlesex University |
| H-0001 | Open University | H-0028 | Newman University College |
| H-0031 | Roehampton University | H-0071 | Nottingham Trent University |
| H-0075 | Sheffield Hallam University | H-0037 | Southampton Solent University |
| H-0077 | Staffordshire University | H-0039 | St Mary's University College |
| H-0049 | University of Bolton | H-0080 | Thames Valley University |
| H-0111 | University of Bradford | H-0017 | University College Falmouth |
| H-0051 | University of Brighton | H-0014 | University College Plymouth St Mark and St John |
| H-0059 | University of Greenwich | H-0026 | University of Bedfordshire |
| H-0061 | University of Huddersfield | H-0053 | University of Central Lancashire |
| H-0120 | University of Hull | H-0011 | University of Chester |
| H-0027 | University of Northampton | H-0082 | University of Chichester |
| H-0069 | University of Northumbria at Newcastle | H-0058 | University of East London |
| H-0074 | University of Portsmouth | H-0054 | University of Gloucestershire |
| H-0158 | University of Salford | H-0021 | University of Winchester |
| H-0079 | University of Teesside | H-0085 | University of Wolverhampton |
| H-0081 | University of the West of England, Bristol | H-0046 | University of Worcester |
| H-0083 | University of Westminster | H-0013 | York St John University |

Source: PACEC/CBR analysis

Table B1.3 Clusters of HEIs – arts and design HEIs

| Arts and design | |
|-----------------|--|
| HESA Code | HEI name |
| H-0197 | Arts Institute at Bournemouth |
| H-0010 | Central School of Speech and Drama |
| H-0199 | Conservatoire for Dance and Drama |
| H-0201 | Courtauld Institute of Art |
| H-0015 | Dartington College of Arts |
| H-0208 | Guildhall School of Music and Drama |
| H-0207 | Leeds College of Music |
| H-0209 | Liverpool Institute for Performing Arts |
| H-0190 | Norwich School of Art and Design |
| H-0030 | Ravensbourne College of Design and Communication |
| H-0032 | Rose Bruford College |
| H-0033 | Royal Academy of Music |
| H-0003 | Royal College of Art |
| H-0034 | Royal College of Music |
| H-0035 | Royal Northern College of Music |
| H-0041 | Trinity Laban Conservatoire of Music and Dance |
| H-0200 | University College Birmingham |
| H-0206 | University College for the Creative Arts at Canterbury, Epsom, Farnham, Maidstone, Rochester |
| H-0024 | University of the Arts London |

Source: PACEC/CBR analysis