

Institution: University of Manchester
Unit of assessment: 16 (Economics and Econometrics)
<p>1. Unit context and structure, research and impact strategy</p> <p>The Unit comprises 38 staff members (35.95 FTE), all within the Department of Economics in the School of Social Sciences. It is built around and led by a core group of eminent researchers producing world class research, creating impact inside and outside academia, who also take leadership roles in the profession which contribute to the public good (Banks, Becker, Griffith, Hall, Nicolò, Valentinyi, Wallace). This group has worked with others in the Unit to foster a collegiate environment in which less experienced researchers can develop, interact, and similarly contribute to the wider profession. We have early and mid-career researchers producing world class research on, for example, long run macroeconomic growth and development (Palma), the macroeconomics of tax policy (Rossi) the microeconomics of tax policy in developing countries (Waseem) and political economy and gender issues in development (Chakravarty). More broadly, we also collaborate with researchers from many other disciplines at Manchester, within the UK, and internationally.</p> <p>Over the REF period our focus has been on building the Unit by growing organically; we have hired high quality Early Career Researchers (ECRs) and helped them to develop by providing a supportive environment with resources, mentoring by senior colleagues and visitors at the top of the profession. Our ambition is to continue building a cohesive Unit covering the breadth of economics, that is well-integrated and collegiate across sub-disciplines, produces internationally recognised high quality research, and is outward looking in its interactions with other disciplines and in the way it communicates its research findings with all audiences.</p> <p>Our strategy has been to prioritise sustainable and ongoing improvements in research quality rather than increases in scale or capacity in specific areas. We have focused on three fundamental strategic aims:</p> <ol style="list-style-type: none"> 1) raise the average quality of research outputs from the Unit and the proportion of research outputs published in the best economics journals, 2) raise the quality of the PhD training programme, and 3) build on our historically strong track record of impact and policy collaboration. <p>To achieve these aims we have made a number of important changes, including:</p> <ul style="list-style-type: none"> • reforming structures and incentives in order to promote and reward high quality research and collaboration; • enhancing our mentoring and staff development procedures, including tightening up and enforcing probationary requirements; and • providing additional resources to enable increased hosting of, and participation in, international conferences, thereby increasing the profile of our research and building partnerships with international and world-leading researchers. <p>These changes have created a vibrant, cohesive and dynamic Unit that is more research active and producing higher quality research outputs. Two consequences of this increasing quality trajectory are the high proportion of our most notable research outputs that were</p>

published in the last couple of years of the assessment period, and the number of these outputs that come from ECRs who have benefitted from the new enhanced research environment. While the total set of returned outputs presents an accurate picture of average quality over the assessment period, the increasing quality trajectory within the period and the mechanisms and staff in place at its end signal continued improvements to come.

In addition to raising research quality, during the REF period we have:

- established a high bar to recruit new staff and built an increased focus on developing the careers of ECRs;
- graduated 65 PhDs, many of whom have secured positions in leading international universities or global economic institutions;
- delivered a step-change in national and international advisory roles and in evidence and advice provision for policy decisions in key areas including health, ageing, productivity, fiscal policy, food safety, macroeconomic policymaking in low and middle income countries, and the UK's COVID-19 response;
- played a formative role in the discipline with regard to the communication of economic research to diverse audiences, including policymakers, the general public and secondary school students;
- achieved a 65% increase in research income compared to the previous REF period, geared by our key role in over £31m worth of interdisciplinary collaborative grants; and
- built on our connections with the Institute of Fiscal Studies (IFS), as well as with other professional networks such as the Centre for Economic Policy Research (CEPR), in order to strengthen our research and impact links and collaborations, particularly with respect to our ECRs.

We have deliberately introduced incremental and structured changes such that the effects will be sustainable beyond the REF period. We are committed to a process of building on these foundations and continuing to improve the research environment. We aim to generate further increases in the quality and quantity of research outputs, increase external research funding levels and continue to enhance Manchester's national and international reputation while continuing to generate impact and support interdisciplinary research within the wider intellectual context of a Department fully embedded in a School of Social Sciences.

1.1. Research strategy and raising research quality

A key innovation within this REF period was a change of organisational structure. We abolished the previous structure of five semi-autonomous Research Area Groups, each with their own Head, and introduced a more inclusive structure with a Research Director and a Recruitment Director assisting the Head of Department in an integrated way across all research areas. Changing to a role-based leadership team facilitated a more strategic approach to managing the Unit's research agenda and underpins the drive to raise research quality and reputation. The Research and Recruitment Directors work with the Head of Department to develop a coherent strategy on managing and incentivising good research. They also oversee mentoring and staff development. This ensures all our

activities are informed by a unified and up-to-date view of disciplinary practice and standards.

The new organisational structure provides an environment within which the Research Director and Head of Department work together, along with senior professors through mentoring and other interactions, to promote a coherent and collective understanding across the whole Unit of (i) what makes world-leading research and (ii) what it takes to produce and publish research in the best economics journals. Likewise, the Recruitment Director works with both the Head of Department and Research Director to develop and implement a coherent hiring strategy that prioritises research excellence at every stage and which is fully informed by the changing norms and standards of the profession.

Seminars and other research interactions have been reorganised to reflect this more unified and more collegiate structure and research environment. There are three broadly distinct, although deliberately overlapping, seminar series: Macroeconomics, Economic Theory, and Applied Economics and Econometrics. Fewer seminars, of higher average quality, and with more overlap between series gives staff broader perspectives on the research questions, methods, and findings that are considered cutting-edge by the discipline at large. We have introduced a weekly brown-bag seminar series for researchers at all levels to present work in progress, enabling timely feedback from a diverse set of colleagues, and reading-group type seminars where groups of researchers can discuss recent important contributions in their fields. Together, these reforms have created a more vibrant and ambitious research environment.

In keeping with these changes, and reflecting our view of ongoing developments in the discipline, as signalled at REF2014 we have emphasised the development of applied research, whether in theory, micro, or macro. We have hired researchers who can contribute to two or even three of these core areas thereby generating positive externalities in the Unit and creating a more interactive and cooperative research environment. For example, in recent years we have built a group spanning macroeconomic development, growth, and economic history (**Valentinyi, Neanidis, Rossi, Palma**). These changes have been achieved while maintaining our recognised strengths in mathematical economics and econometric theory: specialist areas in which Manchester has a long and distinctive tradition of research.

We improved our mentoring and staff-support provision (details in Section 2.1). These processes were revised extensively, bringing greater focus on research agendas and publication quality, and engaging more proactively with ECRs and other staff.

Recognising the value of external engagement in improving research at the work-in-progress stage, we actively encourage researchers, and particularly ECRs, to engage with national and international research communities (via seminars, high-level conferences, research visits, and sabbaticals) and expect all researchers to evidence such activities in their annual reviews. We have deliberately helped to connect ECRs to relevant external research groups and networks, for instance the ESRC Centre for the Microeconomic Analysis of Public Policy at the IFS (where **Waseem, Kovacs**, and Brown have become Research Associates).

Across the REF period we have doubled individual Research Support Allowances, which can be used to help meet the cost of external interactions. Discretionary payments have also been made available directly from Departmental funds, prioritised to help resource these activities where necessary, particularly for ECRs. Taken together, the Department now directly supports over £100,000 of research related expenses each year in addition to the other resources available from the University (details in Section 3).

We have made a number of other strategic changes to improve the research environment. We systematically improved our PhD programme, and in 2019 were able to formally switch to a 2+3 model, as described in Section 2.3. We have become more deliberate in the way that the considerable surpluses from the *Manchester School* journal (approximately £100,000 p.a.) are used to further the Unit's research objectives (see Sections 2.3 and 3). We have hosted several major international conferences to attract world-class researchers to Manchester and provide invaluable networking opportunities for our own researchers (see Section 4).

1.2. Interdisciplinary collaboration

One distinguishing characteristic of the Unit is that it is truly embedded in the School of Social Sciences (located in the Faculty of Humanities) and more broadly within the University of Manchester (UoM). Our researchers share a building and collaborate with colleagues from Anthropology, Sociology, Social Statistics, Politics, and Philosophy in all areas of academic life. We continue to have an excellent track record on interdisciplinary research interactions and collaborations, across the School, Faculty and University. Since 2014 **Banks, Rigby**, and **Sinko** have all independently co-authored and/or co-supervised PhD students with Health Economics and **Banks** has done the same with Sociology and Social Statistics. The Unit's environmental economists (**Ulph, Rigby, Wossink, Manderson, Chan**) work with many other disciplinary colleagues both inside and outside Manchester and two of our development economists Imai and Wang work closely with Manchester's Global Development Institute. Our economic theorists also engage in diverse interdisciplinary interactions: **Nicolò** co-authors with political scientists, health economists, and medical scientists, **Evstigneev** and **Schenke-Hoppé** with mathematicians, **Krol** with cognitive neuroscientists and visual imagers, and **Edhan** with biologists. The integration of Law and Criminology into the School in 2019 offers potential for further interdisciplinary collaborations and interactions.

These interactions include long-standing infrastructural collaborations. Clark and **Peters** work closely with sociologists and social statisticians in the University's ESRC and Joseph Rowntree funded Centre on the Dynamics of Ethnicity (CoDE), which aims to understand ethnic inequality and its drivers in key social arenas and to improve capacity for ethnicity-related research in the UK social sciences. **Banks** is a Co-Director and longstanding member of the management board of the University's Manchester Institute for Collaborative Research on Ageing (MICRA) and works with colleagues from across the three Faculties to bring together research on ageing from all parts of the University, in order to stimulate co-production and collaboration. He also collaborates closely with Nazroo and his team in Sociology through their ongoing roles as founding Co-PIs of the English Longitudinal Study of Ageing (ELSA). Building on the work conducted under her

two ERC advanced grants, **Griffith** is now Co-PI of the NIHR Obesity Policy Research Unit in collaboration with UCL paediatricians, psychologists and epidemiologists.

These collaborations often result in publications in leading journals of other disciplines not returned as outputs for this Unit. We attach high value to such prestigious research outputs both in their own right, and also in their ability to deliver future insights to economics and/or economic policymaking. High-quality applied interdisciplinary research is often a rich source of impact, and many such collaborations are closely linked to our impact agenda, described next.

1.3. Impact

Impact is a strength of the Unit, and it continues to be an important component of our environment. A key condition for successful impact is that the research agenda is informed by the priorities of research users in different tiers of policymaking institutions. Hence we prioritise supporting and promoting links to such institutions where possible. The range of our impact is illustrated in our four submitted impact cases, which demonstrate engagement with a range of policy stakeholders in the UK and internationally, across the fields of health (**Griffith** on obesity, **Nicolò** on donor organ transplants), social (**Banks** on ageing and pensions) and macroeconomic policy (**Agénor** and **Neanidis** on banking and finance). In addition, our strong interactions with policymakers connect our research agenda to questions uppermost in the minds of local, national, and international policymakers. Some of these arise from our ongoing interdisciplinary infrastructural commitments described above. Through CoDE, for example, Clark and **Peters** are involved in delivering a robust and useful evidence-base for policymakers and the wider public and working with institutions seeking to improve their practices in relation to ethnic diversity.

We strategically invested in an additional professorial post specifically to help deliver policy influence and impact regionally and nationally, to which Coyle was appointed in 2014. During her time here (2014-2018) Coyle co-directed Policy@Manchester, the University's leading policy engagement institute, and generated impact directly in her subsequent roles as a member of the Expert Panel of the National Infrastructure Commission and the Natural Capital Committee.

Other interactions with policymakers and practitioners are widely distributed across the Unit, spanning many areas including: gender, macrodevelopment policy, and growth (**Agénor**), productivity (Coyle, **Griffith**), tax policy in low and middle income countries (**Waseem**), food standards and safety (**Rigby**), EU regulation of the digital economy (**Reggiani**), central banking and macroprudential policy (**Agénor**, **Rossi**, **Bratsiosis**, **Neanidis**), regional industrial policy and the Northern Powerhouse (Coyle), the digital economy (Coyle), and hedge fund management and asset allocation strategies (**Schenke-Hoppé**, **Evstigneev**). These links enhance impact from pre-existing research while directing research agendas towards ones that will deliver impact beyond this REF period, building a platform of connections through which such impact can be transmitted on a sustainable basis.

We are proactive in providing resources that support activities to enhance the impact accruing from research. Over the assessment period Coyle and **Banks** have advised

researchers on impact strategies and encouraged them to take advantage of resources available to support activities that might lead to impact. They liaise closely with the School's full-time Knowledge Exchange, Impact, and Business Engagement Officers who facilitate and support such activities. As a result we have received four ESRC Impact Acceleration Account awards (total: £ 34,000) over the period which help finance specific impact activities. **Rigby** received £19k for a project on improving children's understanding of food pathogen risks, **Backus** for work on the fundraising effectiveness of charities (£5k), **Banerjee** to work with local political stakeholders in India on issues of politicians' motivations (£5k), and **Griffith** received £5k (with £5k matched funding from the IFS) for activities relating to communicating economics to students and the public.

1.4. Open access and research integrity

We are committed to open access and the highest standards of research ethics and integrity. As is the convention in economics, researchers are encouraged to disseminate open access pre-publication versions of manuscripts as widely as possible through freely downloadable working paper series. All accepted manuscripts are immediately transmitted to the library's open access team who ensure they are put through full open access procedures, including arranging payment for gold access where appropriate. While issues of research ethics are less relevant for economic theory or applied research using publicly available aggregate or anonymised data, we are nevertheless fully attentive to them and take care to adhere to the highest standards of research ethics and data security where relevant. **Rigby**, **Banks**, **Banerjee** and **Nicolò** are all involved in projects designing and carrying out data collection, often in the area of health or health behaviours, and are experienced in ensuring that all such activities are scrutinised by the relevant ethics committees, whether at Manchester or in the locality/jurisdiction where the research is conducted. **Waseem** uses large administrative tax records and **Banks** uses individual level biomarker or genetic data; each has the appropriate training and complies with the legal, data security, and access requirements necessary to use such data safely. Moreover, the University provides mandatory GDPR and ethics training for all staff renewed biennially.

We monitor and promote research integrity through the annual review processes described in section 2.1. Senior members of the Unit are also leaders in the discipline with respect to research integrity, and act to promote the highest standards in the profession as a whole. **Banks** was a member of, and then subsequently chaired, the joint ESRC, MRC, Wellcome, CRUK Expert Advisory Committee on Data Access and Governance over the period of its existence 2012-2018, and is the economist representative on the recently established ESRC Expert Advisory Board for Data and Infrastructure, Skills and Methods. He was also a member of the European Economic Association (EEA) subcommittee tasked with creating an official position and guidance on research ethics and research integrity in economics. As President of the Royal Economic Society (RES), **Griffith** helped form a working group involving the RES, ONS, ESRC, and RSS to monitor and facilitate the reproducibility and replicability of economic research, particularly research using administrative data. As a current member of RES council, **Wallace** is also involved in ongoing strategic discussions of research integrity and training in the economics profession.

1.5. The future

Our future strategic aims are focused on continuing the direction of travel outlined above and leveraging the gains in quality into the increased international reputation and impact that will flow from higher quality researchers and research. As the Unit's research quality and international reputation grow, we will prioritise supporting applications for greater levels of external research income, thus increasing the Unit's research capacity and ambition even further. At the same time, we will remain alert to possibilities for further strategic and structural action, taking into account external changes in the discipline as well as internal opportunities and challenges.

We will continue to build capacity in applied research, bringing researchers to the group whose specific expertise in microeconomics, macroeconomics, or theory spills over into applied sub-disciplines and applications, thus further connecting researchers in a cohesive, interactive, and collaborative research environment. We will build the group researching long-run growth and productivity issues from macroeconomic, macroeconometric, applied microeconomic, and economic history perspectives. We will also further support and enhance the group studying various aspects of development economics and policy, building on our existing researchers working on tax policy, evaluation and human capital in developing countries, macroeconomic development policy, and more specific micro-development issues.

2. People**2.1. Staffing strategy and staff development**

There has been considerable staff turnover in recent years and we have a staff profile that is both earlier career, more international and higher quality as a result. Consistent with our strategy of a feasible and sustainable improvement in average research quality, our primary focus has been on the way in which we recruit and retain staff at the junior level.

The Department moved to a hiring timetable aligned with the international job market for junior recruitment in economics in 2012. Since 2014 we have invested substantial additional resources and energy in attending and hiring from the US and UK/European job markets. In keeping with best practice, we longlist at least 70 candidates and interview them at the international job market conferences. The hiring committee compiles a detailed and targeted shortlist of ten or so candidates. We then use full-day campus visits to select from the shortlist at the second stage, allowing the candidates to experience the environment and meet potential future colleagues.

Identifying good candidates is only the start; we also offer a new starter package that is competitive and conducive to research. In order to attract high quality candidates and enable them to begin their career on the right trajectory with sufficient time to write up their job market paper and begin new projects, we introduced a heavily reduced teaching load for new staff in their first two years. This involves only one course in their first year and two in their second, coupled with a commitment to enable them to teach in areas closely aligned with their research interests and expertise. The probationary period prior to confirmation in a permanent post is relatively short (four years maximum) but the bar is clearly identified and rigorously enforced.

The market for junior researchers is very competitive; we prioritise making strong, supportive offers to high quality people. As a result, we have often been competing with other higher profile departments. We have been successful in many cases (**Kazak** in econometrics, **Palma** in economic history, **Kovacs** in applied microeconomics, and a further three ECRs who took up their positions in 2020/21: Fliegner, Brown, and Mitra), suggesting we are pitching at the right level to improve quality at a realistic pace.

In line with developments in the discipline, we use postdoctoral positions to provide a more flexible approach to junior recruitment and staff development. We have successfully applied to the UoM's Hallsworth Fund to host postdoctoral positions locally, and, as is becoming common in economics, we delayed start dates to allow some of our new appointments to take advantage of prestigious postdoctoral opportunities prior to joining us. For instance, Fliegner (PhD Toulouse, 2019) took up a postdoc at J-PAL in MIT and Mitra (PhD UBC, 2020) a postdoc at EUI. This makes our offer more competitive and provides valuable research experience for our new recruits.

To support our hiring, we reconfigured our staff development strategy for ECRs. We enhanced and reformed our mentoring programme so that only the most research active and well-published senior staff act as mentors. In addition to prioritising an interactive research environment within the Unit we help connect ECRs to relevant external research networks (e.g., **Waseem**, **Kovacs**, and Brown to the IFS). We also introduced more robust and rigorous probation processes and requirements in order to identify and retain ECRs who have demonstrated the potential to deliver top research outputs. The benefits of this strategy have been playing out over the past seven years with great success. Two researchers successfully came through the new system and contributed important papers to our REF submission as a result, but recently moved on internationally for personal reasons (**Cortes**, **Cho**), while some were not retained having failed to meet the research quality and/or productivity requirements at probation. Others were successfully retained and have now published work in leading journals as they transition to mid-career researchers; 12 Department members have been promoted since 2014, sometimes on an accelerated timetable (e.g., **Waseem** joined July 2014 as lecturer, promoted to reader in 2019; **Palma** joined 2017 as lecturer, promoted to Senior Lecturer in 2020).

At the senior level, a number of professors retired and were successfully replaced by research-active professors whose appointments were a key part of delivering various elements of the new departmental structure and strategic objectives (Coyle, **Valentinyi**, **Wallace**, **Schenke-Hoppé**). The part-time appointments of US-based Yannelis and Villamil came to a natural end and, rather than replace these, we constituted new Sir John Hicks/William Stanley Jevons Visiting Professor positions in 2019 to allow internationally leading and eminent research-active professors to visit for short concentrated periods of time to give a series of lectures and masterclasses, and interact with our researchers. The first two of these were Tim Besley (LSE) and Richard Rogerson (Princeton). Besley visited in autumn 2019; Rogerson's visit was scheduled for 2020, but has been postponed.

We have enhanced the process for supporting and monitoring staff development to facilitate improvements in research quality and productivity. All new ECRs are appointed a mentor, and we provide dedicated career development guidance for early career

colleagues as they apply for probation and promotion. During probation, new appointments undertake the mandatory Humanities New Academics Programme which includes five modules on research-related skills and have a reduced teaching load. All academics and research staff receive an annual Performance and Development Review with one of the Professors from the senior leadership team. This process now involves the preparation and detailed discussion of a Personal Research Expectations Plan outlining research agendas, status updates for work in progress alongside publication and impact strategies, and more tentative future ideas. This allows the senior members of the Unit to engage with and advise on plans and strategies to publish research outputs in the best journals whilst the research is still at a formative stage. As well as helping to construct objectives and goals for the coming year, reviewers can identify specific actions to enhance research quality and help staff identify relevant resources and support in the Department and School.

We have an active sabbatical programme, entitling every member of the Unit to apply for one semester of sabbatical in every seven, with entitlements able to be rolled over and/or accumulated. In line with our aim to increase research quality, applications for sabbatical need to be underpinned by a detailed research plan. These plans are discussed with the applicant's mentor and/or reviewer to ensure the best use of sabbatical entitlement in generating new high quality research. A sabbatical approvals group including the Research Director and Head of Department considers these applications in the light of the applicant's medium run research goals and the longer run research goals of the Unit. 54 semesters of sabbatical leave were granted during this REF period.

2.2. Diversity

The Unit is relatively diverse ethnically and nationally; of our 38 members 6 are BAME (17.5% FTE), 28 were born outside of the UK, of which 16 were born outside of the EU. As with the discipline generally, its female/male ratio is low: 10.5% of REF eligible staff are women. While the rates are lowest among mid-career researchers (17% of Lecturers are women, 14% of Professors), we are working to redress the gender balance at all career stages whenever possible. In the 2019 and 2020 job markets we made a deliberate and specific effort to prioritise the selection of applications from women at the longlisting stage. Women were recruited to four of the five ECR openings in the three most recent job markets.

We are also committed to improving gender diversity and pipeline in the profession more widely, for example by recruiting a higher fraction of female PhD students. While our PhD programme has been 41% female over the period as a whole (see section 2.3) this is on an improving trajectory; at least 50% of each of the three most recent intakes has been female. As President of the Royal Economic Society (RES), **Griffith** worked with Sarah Smith at Bristol to design and launch the RES Diversity in Economics campaign. Finally, supported by the School we continue to address gender diversity issues in all our actions. The School was awarded Athena SWAN Bronze status in 2017, is working towards Silver in 2021, and improving staff and student diversity is one of the School's core strategic objectives.

2.3. Research Students

Our research culture is enriched by our postgraduate community, whose members are key players in our collective intellectual life. Since 2014, UoA staff supervised 65 (53.5 FTE) PhD students to successful completion. We are currently supervising a further 31 PhD students.

We are part of the ESRC North-West Social Science Doctoral Training Partnership (NWSSDTP) which typically funds one or two ESRC studentships per year in economics, including one CASE award joint with the Bank of England. In addition, many students receive full funding from the School. We use *Manchester School* surpluses strategically to attract excellent students via scholarships, to cover job-market expenses for selected students, and to support students financially with RA opportunities. In order to compete for better students, we have increased the number of Department-funded scholarships we offer over and above the scholarships funded by the School and the ESRC. In total, 12 students have received ESRC funding and 30 have been funded by the university.

Throughout this process we have paid keen attention to ensuring we retain the diversity of our intake, which has always been an area of strength. Since 2014 the entrants to the PhD programme have been 62% BAME, 41% female, and 83% international (of which 75% were non-EU born).

As part of our strategy to raise all aspects of research quality in the Unit, we have worked to improve the entry quality of our PhD cohorts and focused on areas more aligned with the Unit's strengths, even if this means smaller intakes. As a result, the size of each cohort has fallen from around 12-15 to 7-10 students per year. Reducing entry numbers and targeting scholarship allocation has enabled us to prioritise supervision responsibilities for staff with a track record of research excellence and a comprehensive understanding of the levels of training, expertise, and contribution that are now expected in the field.

Each student has an experienced supervisory team of at least two academic staff. Academic supervision is supported through a supervisor toolkit, combined with training for all new supervisors. The University's bespoke online student progression system, 'eProg', provides a platform to record and track key progression milestones from registration to examination, to exchange documents for comment and feedback even when off-campus, and to view and book training activities.

We have adapted, modernised, and improved the PhD programme. Crucially, we have moved from a 2+2 to a 2+3 model for the 2019 cohort onwards and received ESRC recognition for funding purposes. While still short relative to the best Economics PhD programmes, this model gives students who want (and have the potential) to aim for academic careers more time to complete the kind of comprehensive research paper required to compete on the international job market.

For students completing their PhDs between 2014 and 2020 the programme had a 2+2 structure. Throughout the second 2-year phase, students were expected to present at the Department's weekly PhD-student seminar series, providing a supportive forum for discussion and feedback on work in progress. All students are encouraged to present their research in the brown-bag and in field seminars at our NWSSDTP partner institutions.

We run two annual conferences for PhD students. At the end of year one in the +2 research phase students are expected to present their first preliminary paper; towards the end of year two, students must present a different, more polished, paper. This latter conference is held jointly with all the students at an equivalent stage in the Economics pathway of the NWSSDTP (i.e., Manchester, Lancaster and Liverpool). The conference includes presentations from internationally renowned keynote speakers (e.g., Peter Wakker (2016), Jeff Wooldridge (2017), Evi Pappa (2018)) who, along with researchers from all three partner universities, participate in the whole conference giving advice and feedback and providing valuable networking opportunities.

In 2018 the NWSSDTP Economics pathway introduced an annual summer school for PhD students, hosted at Lancaster. The first was on the topic of applied microeconomics, with lectures given by Sascha Becker (Warwick), Ruben Durante (Sciences Po & UPF), and Hannes Mueller (IAE-CSIC). The 2019 summer school on applied macroeconometrics and time series featured lecturers James Morley (Sydney) and Luca Gambetti (Universitat Autònoma de Barcelona).

We have doubled the research training support grants available to all full-time PhD students to £1,000 per year (pro-rata for part time students) to encourage student participation in academic conferences and similar events to both promote their research and advance their career prospects. Students and their supervisors are encouraged to bid for other Departmental, School, or Faculty support for specific training or development-related activities.

Given the constraints a 2+2 model places on students entering the international academic job market in economics, we encourage many of our students to take postdoctoral positions while their job-market papers continue to take shape. For example, PhD students have taken postdoctoral positions at Sciences Po (Xu), York (Sayli), Glasgow (McGinnis), Oxford (Masimo, Malaeb), and the Stockholm School of Economics (Margaris). We have launched a competitively awarded teaching fellowship programme to enhance students' development. These fellowships provide funded time beyond the two-year funding constraint for selected students to improve their job-market paper and write up their thesis, allowing them to go to the job market later with a more competitive product. The first two beneficiaries of these fellowships went to the job market successfully in 2019, accepting research positions at the LSE behavioural economics group (Moran) and the Bank of Spain research group (Pidkuyko) respectively.

In addition to training new academics, a key role of our PhD programme is to provide training for those pursuing a career as a professional economist in government or industry. Hence a further indicator of success is the number of PhD students who take such positions. As well as making important contributions to economic policymaking in their own right, these students play a key role connecting the Unit's researchers to international policymaking institutions, providing opportunities for future collaborations, networking and impact. Ten students completing their PhDs since 2014 have gone on to work as economists at, e.g., the International Monetary Fund (Primus, Saliba), the World Bank (Rodriguez Takeuchi), the African Development Bank (Adama, Chuku), the Centre for

Latin American Monetary Studies (Mosquera Tarrío), the Central Bank of Sri Lanka (Pathirage), and the Nigerian Electricity Regulatory Commission (Tajudeen).

This strategy has led to a smaller, higher quality programme delivering better students to the job market, with better chances of securing good positions, either as academics or professional economists in government departments or international organisations. Again, consistent with our improving trajectory over the REF period, our students' placements in recent years have already improved relative to the earlier part of the period (in the last three years, students have placed in research positions at the Stockholm School of Economics, London School of Economics, World Bank, and Bank of Spain, for example). Naturally, given the time it takes to complete a PhD, we expect most of the benefits only to realise fully in future years.

3. Income, infrastructure and facilities

3.1 External Funding

Research income rose by 65%, to £3.71m from £2.25m in REF2014, despite the returned Unit being smaller (35.95 FTE vs 45.2 FTE). Controlling for differences in Unit size and the length of the reference period this represents a 50% increase (from £9.7k per FTE per year to £14.7k per FTE per year). Within this improvement Research Council income rose from £1m to £1.8m.

A wide set of investigators and funders contributed to this total, including new large awards from diverse funders such as the Food Standards Agency ('Estimating QALY and WTP values for microbiological foodborne disease', **Rigby**), ESRC Future Leaders scheme ('Does informality hinder self-enforcement? Evidence from VAT in Pakistan', **Waseem**), ESRC/DFID Growth Research Programme ('Financial Volatility, Macroeconomic Regulation and Economic Growth in Low-Income Countries', **Agénor** and **Neanidis**), ERC FP7 Framework on Cooperation Programme ('Rethinking Finance for Stability and Development', **Neanidis**), and Unilever ('Driving consistency in sustainable choice behaviour', **Ulph**).

The total includes a share of several recent large collaborative interdisciplinary and/or multi-institutional grants, where our researchers are acting in key Co-I, Co-PI or PI capacities, totalling over £31m. Interdisciplinary grants within Manchester include 'Green infrastructure to promote health and wellbeing in an ageing population', NERC, total value £641k, (**Wossink**); 'UK Energy Research Centre Phase 3', EPSRC, total value £253k, (**Manderson**); 'DAMS 2.0: Design and assessment of resilient interventions in water-energy-food-environment megasystems', ESRC, total value £4.3m, (Imai). Cross-institutional, and in many cases interdisciplinary, collaborative grants where our researchers are acting in leadership (PI or Co-PI) capacities include the ESRC Centre for Microeconomic Analysis of Public Policy, c. £10m over 5 years (**Banks**, **Griffith**), NIA/UK Government funded English Longitudinal Study of Ageing, c. £10m over 5 years (**Banks**), ERC 'Empirical evidence on the formation of habits and self-control in food choice', £1m, (**Griffith**) and NIHR 'Policy Research on Obesity', c. £5m over 5 years (**Griffith**), discussed in more detail in Section 4 as part of our contribution to the research base.

We provide direct support for raising external research income. The Research Director and Head of Department disseminate funding opportunities and engage in carefully targeted

approaches to specifically identified researchers. The purpose of the funding call, the career-stage and quality of the potential applicant's research, and the other demands on their time (including existing grant commitments) are taken into account. As part of our staff development and mentoring processes, and as the pool of researchers with successful track records of raising external funding grows, we use these targeted approaches to connect individuals to others so they can share specific knowledge and best practice on grant writing and management.

Targeted approaches to staff, carried out well in advance of call deadlines and complemented by explicit discussions about how we can provide support should the funding application be successful, have proven successful in encouraging more, higher quality applications. Given the improving trajectory of the Unit, we expect this approach to generate further benefits in the future. This approach enables us to take advantage of institutional resources available to support the development of high quality proposals and funding bids; it creates a long term planning horizon in which we can ensure staff have adequate time to spend on their funded projects, thereby increasing incentives and removing disincentives to apply for external funding.

Staff are supported at all stages of the funding process through the School's Research Services team. One of the School's four Research Support Officers has primary responsibility for the Unit. This service provides support for staff navigating and coordinating research funding systems in general. School and Faculty resources assist researchers putting together proposals. These include enhanced support for grant writing, with a full time grant writer available to help draft elements requiring no disciplinary expertise, and small seedcorn-type awards to fund tentative collaborations leading to future proposals. We received £7.5k from such funds in the assessment period, with three grants to support new collaborations exploring funding possibilities and one explicitly supporting the grant process. The latter case serves as a useful example of the value small seedcorn funding can play: **Reggiani** obtained £2k to support an RA in scraping, and carrying out a textual analysis of, social media data as part of developing a collaborative funding application to ESRC/EPSC with colleagues from Computer Science.

Once grants are awarded we reduce researchers' other duties (including teaching) proportionately reflecting the extra time commitments that substantive funded research brings. While support with the preparation of financial aspects of proposals has always been available, we recognised that there was traditionally little support once the grant was in place. Hence in 2018, the School established a separate Grant Management and Administration Team (GMAT) to help with the high administrative burden of running an externally-funded project. GMAT staff help with all aspects of grant management outside of the research itself, including budgeting, financial reporting, liaising with funders regarding timetabling and reporting, and hiring and management of staff if relevant. Finally, the School's Impact Support Officers work with grantees from the outset, identifying potential activities that enhance the impact of the research and helping obtain support for such activities from the School or Faculty. As highlighted in Section 1.3, we received £34k of such additional support for impact-related activities over the period.

Externally funded research projects are also supported by the School's dedicated External Relations Office. The team of 4.4 FTE staff provide full service and assist with conference

organisation, workshops, and public engagement. Thus the dissemination activities commensurate with external funding are increasingly well supported.

3.2 Internal Funding

In addition to our external research income, we take advantage of internal institutional School and Faculty resources to develop and conduct research projects. Some of these resources support or incentivise applications for external income as discussed above, but others are simply to build collaborations, provide funding to kickstart new research activity, or to promote existing research activity and research networks more generally. These are in addition to the small grant-related funding identified above, and can cover diverse research activities. **Evstigneev** won £24k from the UoM's interdisciplinary seedcorn competition to collaborate with Mathematics in the area of mathematical economics and finance; **Edhan** won £7.8k from the Humanities Strategic Investment Fund (HSIF) to support his research on 'Germs and Economic Behaviour'; **Hall** won £7.5k HSIF seedcorn funding to develop collaborative research with health economists modelling links between physical activity and health.

Internal funding is also available to support international conferences, thereby building international collaborations and networks, and indirectly leading to greater future research productivity and enhanced international reputation. **Wossink** won £20k from the Hallsworth Conference Fund to support the annual European Association of Environmental and Resource Economists (EAERE) conference in 2019; **Palma** and Wang won £19k from the same source to fund a two-day international conference on State Capacity in November 2019. *Manchester School* funds are used strategically to provide further targeted support, e.g., for the CEPR's annual Macroeconomics meeting in 2018, the EAERE 2019 conference, and the EEA and Econometric Society European Meetings (ESEM) congresses in 2019 (details in Section 4).

Finally, School funding for small additional costs involved in converting potentially internationally excellent research into world-leading research has also been successfully obtained and targeted towards promising ECR's projects (e.g., **Palma**, enabling him to recruit RAs for essential archival data work in Portugal).

This internal support plays a crucial role covering small but discrete research costs, such as research assistance, one-off data acquisition costs, or the costs of engaging with collaborators. Taken together, individual research support allowances, departmental discretionary research funds (totalling c. £140k p.a.) and the *Manchester School's* revenue (c. £100k p.a.), with the latter two both being used strategically to support activities raising research quality and enhancing its reputation and visibility, create an environment where researchers can access substantial financial resources to support their research or its development. The Research Director, Head of Department, and the *Manchester School's* Managing Editor work together to ensure these resources are targeted effectively across the Unit, particularly toward ECRs who may be yet to raise external funding, enabling them to engage in all aspects of research and research development and ensuring their careers begin on as steep an upward trajectory as possible.

3.3 Physical Infrastructure and Facilities

In keeping with Manchester's leading national reputation in computing science and technology, all the Unit's researchers have access to three on-campus platforms for computationally intensive research: the Computational Shared Facility, the Condor Pool and the Interactive Computational Shared Facility. These provide the tools to run multi-core and high memory computational jobs. As an example of the value of this, **Macnamara** and **Rossi** use these facilities intensively in research projects building macroeconomic models of consumption and income dynamics and inequality with heterogeneous agents for the design of tax policy.

From November 2019 we have had access to a new laboratory for experimental research. In 2017, **Zank** collaborated with behavioural science researchers at the Alliance Manchester Business School (AMBS) to develop the case for a Faculty-wide experimental laboratory as part of Manchester's bid to the UK Research Partnership Investment Fund. The successful £9.6m bid resulted in the creation of a new Behavioural Research Laboratory located within AMBS. This state-of-the-art facility for studying human behaviour in a controlled setting provides a dedicated space that the Unit's researchers can use to conduct lab experiments or other participant-based research activities. It includes 43 networked computers in cubicles designed to allow participants to undertake individual tasks or participate in larger interactions, two individual testing rooms, a dedicated ante-room for focus groups, observations and subject briefings, and specialist equipment for eye-tracking and the measurement of other physiological reactions.

The internationally acclaimed University Library, one of 5 HEFCE National Research Libraries has considerably enhanced its online facilities and digital resources for research staff whether they are on- or off-campus (Section 4, REF5a). Researchers now have access to journal articles as if they were sitting on campus, regardless of location or hardware, through the Lean Library browser add-on. The Library provides comprehensive support for Open Access and takes full responsibility for the management of all stages of the process once an output has been accepted for publication (Section 2.5 REF5a).

4. Collaboration and contribution to the research base, economy and society

4.1 Research base

We have aimed to build an environment which encourages interaction, collaboration and contribution to the public good, both in academia and also with users and funders of research outside academia. Within the profession, we are involved in many activities that make strong contributions to the research base and to the organisation and management of the economics profession. As a prime example, we are now strongly embedded in the discipline's learned societies. **Griffith** was President of the EEA in 2015 (the first woman to hold this role), and President of the RES in 2018-19 (only the second woman to hold this role). **Nicolò** is President of the Association of Southern Economic Theorists 2019-2021. **Banks** was, and **Wallace** is, on RES Council. **Wallace** chaired the review of the RES Easter School for ECRs and led the working group awarding the franchise to University of Bristol; he also serves on the Steering Committee of the Conference of Heads of University Departments of Economics (CHUDE). **Griffith**, an elected Fellow of the British Academy, chaired its Economics Section (2012-2014) and **Coyle** is a Trustee of CEPR. **Palma** was elected Trustee, Council, and Executive member of the Economic History Society in 2019. We are also firmly connected to some of the top collaborative research institutions

and networks in economics, specifically: the IFS (**Banks, Griffith, Waseem, Kovacs**), the US National Bureau of Economic Research (**Banks, Valentinyi**), and the CEPR (**Griffith, Palma, Valentinyi, Waseem**).

Since 2014, our researchers have served as editors of the *Economic Journal* (**Griffith**), *Manchester School* (**Valentinyi**), *Review of Development Economics* (Imai), *Theory and Decision* (**Nicolò**), *Journal of Dynamics and Games* (**Nicolò**), *Journal of Financial Econometrics* (**Hall**), *Journal of Econometric Methods* (**Hall**), and the *European Review of Agricultural Economics* (**Wossink**) and on the editorial boards of many more, for example *Econometrica* (**Griffith**), *Economic Journal* (**Wallace**) and *Journal of Pension Economics and Finance* (**Banks**).

We have devoted substantial effort to generating interactions with the international economics research community, aiming to put Manchester at the centre of academic gatherings in UK economics outside London and the South East, while simultaneously raising the profile of the Unit and its researchers. We hosted the 2015 RES Annual Conference (c. 800 delegates), the 2019 joint EEA/ESEM Congress (c. 1500 delegates), and the 2019 EAERE Annual Conference (c. 750 delegates). As well as hosting and hence acting as local organisers for these conferences, **Banks** was Program Chair of RES 2015 and **Wossink** was Scientific Co-Chair at EAERE 2019, for which **Wossink** and **Ulph** also Co-Chaired the Organising Committee.

We also host smaller scale, more targeted, high-quality workshops, attended by international leaders in the field, again increasing our contributions to, and standing in, the profession. For example, we hosted the prestigious annual CEPR Macroeconomics meeting, co-organised by **Valentinyi** (and co-funded by *Manchester School*), in 2018 and we are hosting the 2020/21 *Review of Economics Studies* May meetings (the 2020 and 2021 meetings have been combined owing to COVID-19). We also ran two series of regular and well-attended international conferences in economic theory: the annual Manchester Economic Theory conference (organised by **Zank**) and a sequence of three conferences in Mathematical Economics and Finance (organised by **Evstigneev** in 2017-2019) that bring together senior and junior researchers to exchange ideas, collaborate, and build networks over a 2-3 day period.

We contribute to major conferences held elsewhere. In addition to numerous keynote and invited conference lectures, our senior researchers gave 9 keynote lectures at annual meetings of major international or national economic associations over the REF period, e.g., at EEA (**Griffith**), the New Zealand Association of Economists (Coyle), the Australasian meetings of the Econometric Society (**Hall**). **Griffith** chaired and/or contributed to the women's mentoring sessions of the EEA (2015-2019) and RES (2016-2019) annual conferences. We are active in promoting research methods for international ECRs in the fields of time series econometrics and ageing respectively as tutors at the 10th Advanced Summer School in Econometrics at the University of Crete (**Hall**, 2015) and the Venice International University Summer School on Ageing (**Banks**, 2016, 2019).

Funding secured from the University's Hallsworth Visiting Professors scheme allowed us to invite a series of high-profile senior economists to visit Manchester, collaborate with our

researchers, give lectures to PhD students, and participate in conferences and workshops organised to coincide with their visits. Hallsworth Visiting Professors in this REF period were: Mohammed Abdellaoui (HEC-Paris), Mardi Dungey (ANU), Edi Karni (JHU), Massimo Morelli (Columbia, now Bocconi), Karine Nyborg (Oslo), James Foster (GWU), and Jarwad Noor (BU). We supplement this scheme with strategic use of *Manchester School* funding, inviting world-leading researchers for short visits to give masterclasses or presentations in the occasional Manchester Economic Seminar series and interact with our researchers. Several researchers have longstanding collaborations with other international institutions, e.g., **Rigby** is adjunct professor at the University of Western Australia, **Hall** is Distinguished Adjunct Professor and Member of the Advisory Board at the Info-Metrics Institute, American University, Washington DC.

4.2. Society and the economy

For much of the assessment period the Unit contained two of the most distinguished and high-profile female economists in the country and internationally, and their contributions to the discipline and to society more generally have been recognised with numerous awards. While at Manchester, Coyle was elected Fellow of the Academy of Social Sciences and appointed Fellow of the Office for National Statistics (2016), received the inaugural Indigo Prize (2017), and a CBE for services to Economics and the Public Understanding of Economics (2018). Amongst numerous awards and honours, **Griffith** received the Birgit Grodal Award (2014), a CBE for services to Economic Policy (2015), was elected fellow of the Econometric Society (2016) and fellow of the Academy of Social Sciences (2017), and made Foreign Honorary Member of the American Economic Association (2020). Her contributions were also formally recognised by the University with the Researcher of the Year Distinguished Achievement Award (2014) for research that has successfully challenged dogma, created a new field of research, elucidated a new paradigm, and made a fundamental change in thinking or impacted significantly on society.

Banks and **Griffith** each contribute broadly to the national economics infrastructure and research base through their roles as Co-Directors of the ESRC Centre for the Analysis of Public Policy at the IFS. This centre has secured long-run UKRI Institute status (c. £10m every 5 years). They also play a key role in setting the broad research agenda of the IFS, which comprises some 60 FTE economists and is the highest profile economics policy laboratory in the UK. They run additional large grants generating extensive cross-institutional collaborations and engagement. **Griffith** has held two ERC Senior Investigator grants, and is Co-PI of a Public Health England Research Unit on Child Obesity (joint with UCL and ICH, £5m every 5 years). **Banks** is Co-PI on the English Longitudinal Study of Ageing (joint with Nazroo in Manchester Sociology, UCL, and IFS, £10m every 5 years) and a Co-PI for the Deaton Review on Inequality funded by the Nuffield Foundation (c. £4.5m over 5 years).

We are strongly connected to research funders and contribute to the discipline, and research infrastructure more generally, through our activities in this capacity. **Griffith** is a member of ESRC Council, as was Coyle while at Manchester, and has twice chaired the ERC research-funding panel in Economics and Management. **Banks** is a Trustee of the Nuffield Foundation, a strategic advisor to the ESRC on its Longitudinal Data Strategy and was a member of the US National Institute on Aging Behaviour and Social Research Data

Infrastructure Review (2015-2016). Since 2019 he has been Expert Advisor to the ESRC on Data and Infrastructure, Skills and Methods and in 2020 was appointed to the UKRI Infrastructure Advisory Committee. **Agénor** served as an Evaluator of the ESRC World Economy and Finance programme and as a member of the Panel of Experts and Co-Chair of the Selection Committee for a GRCF funding call. Finally, and reflecting the international nature of our researchers, we are connected to international research councils and research funding bodies. Since 2014 our researchers have sat on expert review panels for national science funders in Switzerland, Spain, Austria, Netherlands, Norway, France, Flanders, and for the EU Horizon 2020 (Maria Skłodowska-Curie Actions) programme.

We have strong links to policy makers and other users of economic research. These connections and collaborations allow us to present our research findings, give informal advice or opinion to those designing policy or exploring its implications, and to hear from others about the issues they face. Many such interactions, collaborations, and connections are not specific to single pieces of research and hence not reflected in our impact cases.

Rigby is an Expert Member of the Food Standards Agency's Social Science Advisory Committee, Clark is the economist member of the School Teachers Review Body (2014-2020), and **Banks** was a Lead Expert on the Government Office for Science Foresight Project on Analysing the Challenges and Opportunities of an Ageing Society (2014-2016). Coyle was a member of the Natural Capital Committee (2016-2019) and a member of the Expert Panel for the National Infrastructure Commission (2016-2018). **Agénor** was seconded to be full-time Senior Advisor to the Financial Stability and Development Group, the research network formed by the seven largest Latin American central banks (2016-2018). During that time he provided advanced training in macroeconomics and collaborated on various research and training projects with researchers from the region including from the Bank for International Settlements, the IMF, the World Bank, and the Inter-American Development Bank.

Our researchers have also actively provided one-off policy advice in areas of expertise. Coyle, an acknowledged expert on economic statistics and measurement more generally, gave evidence to the Treasury Select Committee (2016), the Bean Review of Economic Statistics (2015, 2016), and the US Council of Economic Advisors (2016). She was invited speaker at the OECD Economic Policy Forum (2016, 2017), the June 2017 Group of 30 Conference at the Bank of England, the January 2018 Davos World Economic Forum, and the June 2018 G7 Finance Ministers symposium. **Griffith's** PHE funded policy research unit on childhood obesity is in constant communication with PHE and the Department of Health, and **Banks** has repeatedly led discussions with officials from the Department for Work and Pensions. Our researchers collaborate with and provide advice for a diverse set of international policymakers, including the UN International Fund for Agricultural Development (Imai), Pakistan Federal Board of Revenue (**Waseem**), Italian National Transplant Service (**Nicolò**). **Banks** and **Griffith** were both invited to give private seminars and lead discussions with the highest level officials from HM Treasury, the Department of Health, and the Office for National Statistics during the COVID-19 pandemic.

Other key connections have been with local policymakers, notably the City of Manchester and North West Region. Coyle and colleagues at Manchester worked closely with the Greater Manchester City Authority and the region more generally under the Northern

Powerhouse umbrella and she subsequently chaired the Greater Manchester Prosperity Review (2018-2019). With the rising importance of regional investment agendas, Coyle's work in this area has become increasingly influential in Westminster: she gave evidence to the National Infrastructure Commission in 2016 and 2019, and was a commissioner on the Industrial Strategy Commission in 2017.

We have a strong record of contribution to society through public engagement, promoting economic research and economic thought in general. Our senior researchers have delivered numerous high-profile public lectures, including the RES Annual Public Lecture (**Griffith**, 2015), The LSE Public Lecture (Coyle, 2015), The IFS Annual Public Lecture (**Banks**, 2015) and the HEFCE Annual Conference Keynote Lecture (Coyle, 2015). We hosted three RES public lectures given by **Griffith** (2015), Phillip Kircher (2016), and Steve Machin (2017) to audiences of between 200 and 550. Since 2017 we have built on this by hosting regular public lectures co-organised by the IFS to promote applied economic research. To date we have held five lectures on various aspects of public economics, with attendance ranging from 180 to 350. In the last two years we won RES Discover Economics grants to enhance these events, targeting Year 12 widening participation, BAME, and female students and their teachers by including interactive and networking sessions with staff alongside the keynote lecture. The March 2019 event, chaired by Nicholas Barr (LSE), was attended by 180 including 75 school students and teachers; the March 2020 event, chaired by **Wallace**, was attended by 186, including 134 students and teachers.

Griffith has led the development of, and contributed to, specific digital resources and infrastructure aiming to promote economic research beyond the academic economics community. With funding from the Impact Accelerator award discussed in Section 1.3, she developed resources for economics researchers and students focusing on developing skills in communicating economics, <https://www.communicatingeconomics.com/>. This topic was also the subject of her 2019 invited lecture to the Society for Professional Economists. She is a founding editor of Microeconomic Insights <https://microeconomicinsights.org> and during the COVID-19 pandemic, she founded, raised funding for, and subsequently led the development of the Economics Observatory <https://www.economicsobservatory.com/>, bringing together and disseminating rapid-response economic research and thinking relevant to COVID-19 and its broader implications. The value of these activities was explicitly recognised when **Griffith** subsequently received a DBE for services to Economic Policy and Education in the 2021 New Year's Honours list: the citation noted that 'Dame Rachel has broken down institutional barriers and has brought together public, private and academic economists in the pursuit of a single national goal'.