

Institution:

University of Essex

Unit of Assessment:

16 – Economics and Econometrics

1. Unit context and structure, research and impact strategy**Context and Structure**

Economics at Essex has a distinguished tradition of excellence which has kept it at the cutting edge of theoretical, applied and policy-relevant research. Consistently strong performance in past REF and RAE exercises, as well as a high profile in international rankings, such as those compiled by RePEc and Tilburg University, reflect our reputation for producing research of the highest international standard.

The Essex economics UoA consists of members of the Department of Economics and the economists based in the Institute for Social and Economic Research (ISER), which is an interdisciplinary institute devoted to data analysis and policy-relevant research. In 2017, ISER received the Queen's Anniversary Prize for Higher and Further Education, the highest national recognition for the work of a UK university. These two units are co-located, providing a vibrant environment that promotes collaboration and cross-fertilisation of ideas. Several members have moved between the two departments or have been joint appointments. The PhD programme is also integrated with students taking courses and drawing on expertise in both units, including joint supervision.

The period since the last REF has seen substantial evolution both in the membership of the group and in the range of expertise. We are returning 54 members as compared with 34 in REF2014. In REF2014, one of our stated aims was to expand our core clusters into new areas of research. Since then, we have recruited a cohort of 23 younger scholars who have brought new ideas, which have refreshed and renewed our lively research environment, and whose research potential is now being realised. While we have maintained our traditional areas of excellence, we have broadened our research capacity into other areas, particularly in applied economics, where the frontiers of research are advancing rapidly. As a result, our research clusters (with overlapping membership) are now broader than those that formed the focal points in the last REF, creating a highly interactive environment conducive to producing research of world-leading quality in terms of vitality and sustainability.

Our research falls into the following clusters, each of which is led by a senior faculty member.

- 1) Microeconomics, which includes behavioural and experimental economics, economic theory, economic and social networks, political economy and industrial organisation.
- 2) Macroeconomics, which includes our traditional expertise in search and matching but now embraces macro policy, finance and banking.
- 3) Econometrics, which spans theoretical and applied time series, micro-econometrics, non-parametric methods and spatial econometrics.
- 4) Applied Economics, which is the largest group and the one that has expanded most and now includes labour, education, family, health, crime and development economics and public finance.

Particularly important in the applied cluster are our research centres, which provide key focal points for research. These are the recently refunded Centre for Micro-Social Change (MiSoC); *Understanding Society* based around the UK Household Longitudinal Study (UKHLS), the UK's world-leading household panel survey; Centre for Microsimulation and Policy Analysis (CeMPA, formerly EUROMOD), which is internationally renowned for micro-simulation; and EssexLab which

is now one of the largest and best-equipped labs in the UK for experimental economics. These centres give Essex a distinctive multidisciplinary aspect, involving active collaborations with sociology, political science, demography, epidemiology and socio-genetics.

Economics at Essex is a world leader in developing the interplay between economic theory, data collection and analysis, and econometric identification and inference. This is evidenced by the quality of the output currently submitted and the sustained high performance in past REF and RAE exercises. Essex economists, unified by a commitment to compelling theory and rigorous empirical analysis, form a vibrant and collegial research group that fosters productive interactions and creative dialogue. This involves a network of intense collaborations within and between individuals and clusters at Essex as well as fostering a range of connections with external researchers and institutions. Other focal points include five well-attended seminars every week, numerous specialised workshops every year, and joint supervision of PhD students. In line with the University's approach, we are fully committed to an open research environment, with institutional resources available for open access to all published research funded by UKRI, as well as to a culture of research integrity, ensuring that our work is conducted according to appropriate ethical and legal standards. These elements combine to create a lively, energetic and highly professional research environment, which involves frequent day-to-day interactions, sharing ideas, developing synergies and collaborations as well as building external networks with both academic and other stakeholders.

These strengths have brought considerable success in publication, in attracting research funding and in impactful policy-related contributions. Over the period since 2014, members of the UoA have published 390 papers (90% of which with green or gold open access), many of them in leading international journals. They have also raised £32 million in research grants, £8 million more than during the REF2014 cycle. The UoA has enacted the University's strategic plan based on sustainable growth that will power success in the future (see REF5a). Academic leadership has been strengthened through strategic senior appointments and promotions as well as recruitment of a large cohort of highly talented early career researchers (ECR) who are developing impressive research profiles. Our infrastructure has been expanded through support from the University and external funding, which underpins existing research activities and facilitates the establishment of new focal points. This exceptionally dynamic environment, coupled with a clear strategic vision, nourishes and advances top quality research and PhD study now and into the future.

Research and Impact Strategy

Commitment to Excellence. In the 2008 RAE and the REF2014, we reaffirmed our long-standing commitment to excellence in economic theory, economic modelling and policy-relevant applications. The University's strategy and research priorities, centred on quality, sustainability and impact, have guided the UoA's decisions since the last assessment (see REF5a).

Our primary objective is to maintain Essex as an internationally recognised centre of excellence in economics through a planned combination of:

- (a) ambitious research staff hiring and retaining strategies to expand research power and develop knowledge;
- (b) focused training and investment to foster and sharpen research impact, coordinated jointly with the University's Research Enterprise Office (REO) and the UoA's Director of Impact;
- (c) effective programmes to support external research funding and publications in leading international outlets, including open access research, and a culture of research integrity; and
- (d) active promotion of collaborative research projects both at Essex and worldwide to facilitate a sustained exchange of research ideas, collegiality and sustainability.

One of the key aspects of this approach is mobilising large institutional financial resources (e.g., £850,000 on research support and a total of £40,000 on impact support) to bring out research excellence and maximise the development of strong partnerships with users.

In what follows, we illustrate our success in implementing these strategies and achieving our objectives over the current REF period and describe the ways in which we collectively plan to pursue them in the next REF cycle.

Microeconomics. Led by Ganguli. This is a vibrant cluster that brings together more than 25 researchers, who work on a diversity of topics using a range of different cutting-edge methodologies and sharing the goal of advancing microeconomic research. It widens the pre-existing focus on decisions, games, industrial organisation and networks to embrace behavioural and experimental economics, financial economics and political economy. The cluster's events include a weekly seminar series, joint events with computer science, and a microeconomics lunch, all of which include PhD students. Its members host a range of distinguished visitors and organise workshops on topics such as social and economic networks, decision theory and applications, and identity, inequality and beliefs.

Achievements. The cluster has exceeded the goals set out in REF2014, by maintaining excellence in existing areas while developing new research initiatives, using a wide range of different methodologies. Our traditional strength in network analysis is reflected in work by Condorelli, Galleotti and Renou showing how dynamic models of bargaining in networks can be used to understand key features of markets with asymmetric information (REStud 2017). Linking to finance, Gottardi shows how network structure affects firms' investment behaviour and risk-sharing (Rev Fin Stud 2017) and Weidenholzer shows that social networks increased investors' risk-taking through the emergence of copy-trading (Man Sci 2020). Our expanding presence in behavioural and experimental economics is enhanced by senior and junior appointments. Friedman's recent work uses experimental evidence to test theories of market price dispersion and understand price cycles and dynamics (JPE 2020; REStud 2014). Mengel provides experimental evidence showing how the structure of networks affects individuals' belief formation (JEEA 2020) and also how neighbourhood networks influence compliance behaviour (AEJ-Applied 2020). Using lab experiments, Dianat tests the degree to which agents strategically misrepresent their preferences (GEB 2016). Several of these outputs have been crucially supported by local resources, such as the Essex Centre for Experimental Social Science (ExCESS) and EssexLab.

Our wide-ranging strength in economic theory is demonstrated by work such as Argenziano's novel interdisciplinary analysis of how individuals may form different beliefs from the same evidence (PNAS 2019), Ganguli's work on strategic interactions in a framework more general than standard expected utility (JET 2016), and Erlanson's study on the strategy-proof allocation of multiple resources (JET 2015). Other examples include Condorelli's work showing that revenue-maximising and efficient auctions are not collusion-proof (JET 2018) and Siemroth's demonstration that crowdfunding can lead to efficient capital allocation (JEEA 2019) and that public policy can negatively affect information aggregation (JET 2019). In political economy, Oliveros analysed dynamic collective actions problems where competition among external principals (e.g., lobby groups) strengthen or weaken collective policy decisions where free riding is possible (AER 2017). Galleotti and Ghiglino show how centralised or collective policy-making can be improved when privately-known information must be aggregated (Am J Pol Sci 2015).

Impact. Rockett's impact case study, developed at Essex and drawing on our strength in economic theory, was developed in collaboration with Régibeau, formerly at Essex, and now serving as Chief Economist at the European Commission's DG Competition unit. The work was facilitated by Essex's generous co-working policy, which allowed involvement with Commission policy to be built gradually over a number of years. The impact claim focuses on the design of methods of technology transfers that promote innovation and consumer welfare. By proposing a series of economic theory-based revisions of the regulatory framework governing technology transfer agreements, and gaining acceptance of those proposals, it influenced the 2014 revision of the EU guidelines.

Supported with institutional impact funding, Alan's experimental case study of investment in non-cognitive skills also forms part of a wider interest at Essex in these issues and involves Kubilay as co-author on one of the papers (EJ 2020). The research, funded by the ESRC, the British Academy and ING Bank and implemented in partnership with the Turkish Ministry of Education, involves experiments and randomised control trials of low-cost school curriculum interventions that foster 'grit' and improve test scores and forward-looking behaviour. This evaluation method has been adopted in four World Bank programmes.

Other research in the cluster has also attracted users' attention. Argenziano's work on the economic effects on firms of software platforms and the effect on consumer welfare of online privacy has drawn interest from the US Federal Trade Commission and UNESCO. Similarly, Siemroth's work on capital allocation via crowdfunding attracted the interest of the Spanish Stock Market Commission.

Strategy. The cluster will extend and enhance existing capacity in network analysis, facilitated by the recent establishment of the Centre for Social and Economic Network Analysis (SENA). Led by Ghiglino and including Clymo, Mengel, Mueller and Weidenholzer, it will widen the scope of network analysis, ranging from financial contagion and productivity linkages to social identity and peer effects, and include a distinctly interdisciplinary element. Similarly, the newly established Centre for Experimental Social Sciences (ExCESS), led by Mengel, Wiedenholzer, Siemroth (and Nolen, until his untimely death in October 2020), will deepen existing synergies among our rapidly expanding group of experimental economists, supporting applications for external funding, fostering interdisciplinary work and promoting Essex as an attractive place for PhD research.

A rich set of individual research plans includes: firm-based experiments on company training and identifying investment opportunities (Siemroth and Mengel); collective incentives and cooperation in teams with imperfect monitoring (Mengel and Weidenholzer); consumer privacy preferences and regulation (Argenziano); optimal allocations with capacity constrained verification (Erlanson); capital structure and hedging demand in incomplete markets (Gottardi); the formulation of a dynamic theory of endogenous polarisation by political elites (Wang) and the role of altruism and ethnic fragmentation in redistribution (Mueller and Ghiglino). There is also active work related to COVID-19, such as efficient choices in an epidemic (Gottardi) and the sustainability of testing as a suppression policy in a model of epidemic diffusion (Wang).

Macroeconomics. Led by Coles. Substantial expansion has prompted the establishment of this cluster, which supersedes the previous equilibrium search and macroeconomics cluster. Its growth follows the intensive hiring of high quality senior and junior macroeconomists, which not only builds on its existing strengths but also brings new expertise. It now includes 18 members: six professors, two readers and ten lecturers and embraces both theory and applied work. Focal points include macro/labour, public/fiscal, monetary, banking, international and economic growth. This lively, collegial cluster holds weekly macro seminars along with a partially integrated internal seminar series. The Essex search and matching group additionally holds twice yearly international quality workshops, now extended to weekly seminars (joint with Royal Holloway, London and Bristol University). A large attendance in the UK and overseas has helped to create a wide network of researchers in the field.

Achievements and Impact. One of our goals in the last REF was to maintain and advance search and matching as a strategic research area and we have continued to produce top quality research. Coles made a major breakthrough on a previously elusive issue by developing a tractable equilibrium framework for firm growth and worker turnover across the business cycle (Econometrica 2016). Carrillo-Tudela and Coles consider the interaction of job search, human capital dynamics and optimal wage contracting and show empirically that foregone human capital accumulation is the major cost of being laid off (REStud 2020). This new insight has important implications for future policy. Carrillo-Tudela demonstrates that workers' private information about their ability helps to explain the relationship between job-to-job transitions and wage outcomes (JET 2015). Clymo shows that, when governments can only commit over finite time horizons,

optimal fiscal policies deliver large welfare losses compared to full-commitment policies but do better compared to no commitment (EJ 2020). Smith shows how a model of stock flow matching can replicate hot and cold spells in the housing market (RED 2020).

The broader scope of the macroeconomics cluster is reflected in the research of newer members. Mayr constructs a model of the effects of inheritance tax that, unlike traditional models, better explains its impact on heir's labour supply decisions (JPubE 2020). Gottardi studies optimal tax and public borrowing in a dynamic incomplete market model (AER 2015). He also investigates the risk sharing properties of allocations in dynamic economies with collateralised debt (REStud 2015), the impact of information provision about borrowers' past defaults (AEJ-Micro 2015) and competitive search equilibria in decentralised markets with adverse selection (TE 2019). Motivated by the European debt crisis, Mueller develops a dynamic model of sovereign debt and structural transformation with limited enforcement and moral hazard to show that reform effort decreases in a high-debt range (AER 2020). Altermatt examines the conditions under which optimal monetary policy should take account of asset prices (JET 2019). With a focus on China, Wang uses an overlapping generations model with endogenous labour supply to evaluate the effects on pension reform on intergenerational redistribution (AEJ-Macro 2015); and he uses a political economy macro model to assess the effect of policy reforms on reducing market frictions and supporting economic growth (JEEA 2020).

Strategy. The core of the macroeconomics cluster's strategy is centred around regular high quality invited seminars, often held twice weekly. The advantages of this include: the integration of new members of the unit into the worldwide research environment; the rapid development of new ideas (where the time gap between new research being produced and being published is long and varied); and the discovery of new junior talent with implications not only for joint impactful research ventures but also the hiring of excellent researchers.

Internal seminars and workshops are also important for: fostering new research strands within the cluster; encouraging collaborative work; supporting applications for research funding; and providing an effective way for senior members to mentor the research activities of new staff and PhD students. Ongoing examples of senior/junior collaborations include Carrillo-Tudela, Coles and Clymo who investigate the interaction of firm/worker job turnover with unemployment over the cycle; Carrillo-Tudela and Clymo who have recently won research funding for their project on COVID-19 and the labor market; Coles and Mayr who consider optimal unemployment insurance policy; Gottardi and Mayr who analyse the effects of taxation on entrepreneurial choices and inequality. Meanwhile, Mueller continues to collaborate with Storesletten (Minnesota) and Zilibotti (Yale) on debt overhang and structural reforms.

Econometrics. Led by Gupta. This was not distinguished as a separate cluster in REF2014. Its establishment reflects a strategic reorganisation of our expanding activities, and it shares the overall key aim of research excellence. Core members include Chambers, Cornellisen, Gupta, Kanaya, Kemp and Sakarya. Areas of expertise include: time series analysis; spatial/network econometrics; nonparametrics; and panel data methods. Three of the current members have been appointed since 2017, reflecting our commitment to a range of econometric fields while maintaining a cohesive group, publishing in leading journals and providing vital externalities to other colleagues. Most cluster members are Fellows of the Essex Centre for Macro and Financial Econometrics (ECMFE), a joint research centre supported by the Department of Economics and the Finance Group in Essex Business School (EBS); Chambers is Deputy Director of ECMFE.

Achievements and Impact. During the REF period, five core members of the cluster have published a total of 28 articles, most of which have appeared in high-quality econometrics and general interest journals. Of particular note are Chambers' work on continuous time and mixed frequency data and frequency domain estimation of cointegrating vectors (J Ecm 2016, 2020), Gupta's work on spatial autoregressive models (J Ecm 2015, 2018) and Sakarya's work on Hodrick-Prescott filters (REStat 2016). Kanaya develops a bounds-based test to estimate admission practices at universities (REStat 2017).

Chambers was awarded a large ESRC grant, joint with Taylor (EBS), on the analysis of non-stationary time series in economics and finance with a focus on co-integration, trend breaks and mixed frequency data. Kanaya received the 2018 Econometric Theory Multa Scripsit Award for his multiple high quality contributions to the journal. These accomplishments are associated with major research grant success. Gupta was awarded an ESRC New Investigators Grant over three years for an ambitious project developing econometric methods applicable to network-dependent data. The group has also used these resources to organise specialised workshops, such as time series modelling and structural change, and non-linear models in econometrics and macroeconomics, the latter involving speakers from the Bank of France, the Bank of England and the Federal Reserve.

Strategy. Time series members will maintain strong synergies with ECMFE and, with the appointment of Cornelissen, the cluster plans to expand expertise in micro-econometrics in order to strengthen links with a wider array of applied economists, at Essex and elsewhere. With a focus on publication in top international journals, members of the cluster plan to develop existing strengths and explore new topics. For example, Chambers will use a mixed frequency data approach to investigate whether high frequency information (e.g., stock prices) can help predict economic downturns in advance of quarterly GDP figures becoming available; Gupta will work on credit spillovers and the analysis of spatial/network data in other distinctive settings; Kanaya will analyse demand and welfare analysis in discrete choice models with social interactions. The cluster will continue to disseminate their cutting-edge work at UK and international conferences and seminars. Ongoing research grants plus cluster funding will provide support for further events following on from the successful and broad-based 2019 econometrics workshop. The success of the cluster will be sustained in the next REF period by attracting new external research funding, particularly large grants from the ESRC, and by expanding its size, scope and diversify with new appointments.

Applied Economics. Led by Francesconi. This large and multi-faceted cluster has a vibrant research environment and strong links internally and with members of the other clusters and also with partners in other disciplines. It covers the following broad research areas: labour, household and family behaviour, health, human capital, crime, public and development economics and policy evaluation. Research in these fields is characterised by a shared interest in the creation and analysis of survey microdata and an openness to interdisciplinary research. This is most explicit in the activities of the three inter-linked research centres, MiSoC, Understanding Society and CeMPA, which are described in more detail below.

Overall, the cluster includes 16 professors and senior staff, 15 lecturers, and 18 postdocs, research assistants and associates. Particularly important are the PhD students who are attracted to Essex by our reputation in applied research and are fully integrated into our research community. The high level of engagement between members of the cluster is reflected in bi-weekly cluster-specific internal workshops where ongoing research, especially by junior members, is critically and constructively discussed in a collegial environment. Every year, the cluster also holds at least three themed two-day conferences, involving internationally recognised scholars. Some examples include: Family Policy and Evaluation (June 2019; van der Klaauw, Rasul, Løken); Advances in Applied Microeconomics (June 2019; Giuliano, Zafar); Economics of Higher Education (June 2018; Arcidiacono, Stinebrickner; Leuven); Innovation and Labour Markets (May 2018; van Reenen, Oyer); Parental Beliefs, Information and Investments in Children (May 2017; Cunha, Salvanes); Subjective Expectations and Probabilities in Economics and Psychology (March 2014; Manski, Fischhoff, Attanasio, Lochner).

Achievements. The applied cluster has achieved and exceeded the goals set in REF2014, which were to produce high quality research on micro-data and expand into areas such as household and family behaviour, education, crime and health. An example at the intersection between family and labour economics is Coles and Francesconi (JPE 2019), who develop a new framework with two-sided search and multiple attributes and use it to explore the impact of equal opportunities for women in the labour market on the timing of family formation. Innovative work on households and health includes Cornelissen's findings that children with most to gain from childcare are least likely to be selected into it (JPE 2018). Bhalotra finds that psychotherapy reduces maternal depression in

the medium term (AER 2020) and that maternal health is positively associated with twin births (REStat 2019). Other research on early child investments includes Del Bono and Francesconi who explore the relationship between early maternal time investment and child outcomes (EJ 2016), while Del Bono and Rabe analyse the impact of free pre-school education on outcomes of children in primary schools and find little evidence of a lasting effect (EJ 2016).

At the intersection of health and crime, Francesconi estimates the effect of excessive alcohol consumption and finds that binge drinking leads to a large number of arrests, hospitalisations and road traffic accidents (EJ 2019). Xia finds that taxi colour plays a major role in affecting road collisions through differential visibility (PNAS 2017). Mastrobuoni uses microdata on bank robberies to estimate individual-level disutilities of imprisonment (EJ 2020). Using changes in inmates' expected sentence length, Campaniello and Mastrobuoni find lower suicide rates among inmates when pardons are proposed in parliament (JEEA 2017).

Another key focus is understanding gender gaps. Lippmann shows that gender-equal institutions can create an environment that breaks male breadwinner norms and their consequences (EJ 2020). Alan and Kubilay provide evidence that the gender gap in leadership is due to dramatic declines in social confidence among women during adolescence (EJ 2020). Related to this, and using Essex-based experimental evidence, Nolen finds that in single sex environments young women become less risk-averse (JEBO 2014). Delavande, Del Bono and Holford estimate a discrete choice model of time allocation decisions made by university students using data on subjective expectations and field experimental data (J Ecm 2020). Bhalotra provides new evidence on how the election of women to political office in India could lead to lower subsequent participation in the presence of entrenched gender bias (EJ 2017) and shows how reform of property rights in West Bengal influenced within-household inequality and intensified son-preference (AEJ-Applied 2019).

Our ongoing strength in labour economics is reflected in the innovative study by Cornelissen, who estimates how co-workers affect each other's productivity and finds small peer effects in wages among high-skilled workers (AER 2017). Symeonidis finds that greater competition in product markets leads to more strike activity (EER 2017), while Serafinelli shows that labour flows between firms contributes to inter-firm knowledge diffusion (JoLE 2019). Reynolds finds that simultaneous inventions are concentrated by locality (AEJ-Applied 2020). Hatton analyses conflict and policy as determinants of applications for asylum to European countries (JEP 2020). Shifting the focus to inequality, Brewer illustrates that the incidence of the cuts in rent subsidies falls disproportionately on tenants rather than landlords (J Urb Econ 2019), while Etheridge uncovers the heterogeneous effects of house prices and persistent income shocks on household consumption (IER 2020).

Impact. A perfect example of mobilising resources to facilitate the link between research excellence and developing strong partnerships with users, Mastrobuoni's impact case study shows the effect of IT-based 'predictive policing' on reducing commercial robberies and increasing clear-up rates in Milan (REStud 2020). The methodology developed in that study was supported by a Mid-Career Fellowship award from the British Academy and used in cooperation with Essex Police to evaluate their 'Operation Insight' implemented from 2013 to 2015. The results revealed that this particular form of targeted general purpose patrolling was much less successful in reducing crime (IZA DP 11393).

A wide interest in gender and social identity issues forms the background to Mengel's impact case study, based on her paper on gender bias in teaching evaluations (JEEA 2019). The result, that university teaching evaluations tend to be biased against female instructors has been widely disseminated, gaining an Altmetric score in the top 0.002% and has influenced policy in at least 14 universities. A supporting paper on gender differences in networking (EJ 2020) features an experiment which stems from work in EssexLab and which, like other related papers, is communicated to a wider audience through blogs and social media activity.

Bhalotra's work on infant care in Scandinavia and the UK provides causal evidence that persistent effects of exposure to disease in infancy can be mitigated with infant health programmes (JEEA

2017; AER 2020). This research was based on building international collaborations and was funded by the Bank of Sweden. By persuading politicians and civil servants, the findings have now been adopted as part of the official national guidance for child health care practitioners in Sweden.

Strategy. Our aim for the next REF cycle is to maintain and enhance our excellence in applied research through developing ongoing and new cross-disciplinary projects. Here are just a few examples. Baysan and Kubilay will continue their collaboration with Alan on mitigating social exclusion of refugee children in Turkey. Cornelissen, Bhalotra and Del Bono will further expand their overlapping broad agendas on early child development, skill formation and infant and maternal health. Francesconi, Serafinelli, Xia and Cornelissen will explore new issues on local labour markets in Europe and China. Lippmann will investigate gender issues and policy-making. Breaking new ground in crime research, Mastrobuoni will model criminal behaviour in order to design optimal police deployment. Etheridge, Fisher and Rabe will continue their interrelated work on the impact of COVID-19 on productivity, spending, schools, gender gaps and well-being.

MiSoC. Led by Del Bono. The research activities of this multidisciplinary ESRC-funded Centre are closely integrated with the Economics Department, through joint external and internal seminars and study groups and joint PhD supervision. MiSoC received ESRC funding of £4.5 million for 2014-19 and £6.2 million for 2019-2024 to pursue research on how individuals and families respond to the challenge of the world's need for an adaptable labour force. It has leveraged £1.41 from other grants for every £1 of the ESRC Centre grant and it was central in the award to ISER of the Queen's Anniversary Prize in 2017 for its 'authoritative social and economic research to inform the policies of governments for the improvement of people's lives.'

Achievements. Those connected with MiSoC have gained international recognition for work on subjective expectations (Delavande REStud 2016; Delavande AER 2017); child outcomes, parental investment, maternal mental health and policy interventions (Bhalotra JEEA 2017, AER 2020; Del Bono, Rabe EJ 2016; Del Bono, Francesconi EJ 2016); and inequality (Brewer J Urb Econ 2019; Etheridge IER 2020). This experience, combined with survey expertise, has been mobilised for an ongoing ESRC-funded project (BOOST), which is tracking 2,000 students through their university education and beyond to analyse in depth the student experience and links with socioeconomic outcomes, aiming to evaluate university policies and procedures.

Impact. MiSoC's research has had policy-related impact in a variety of areas, including policy towards people with disabilities, the equalities agenda, measurement of income inequality and tax and benefit design. Rabe, Del Bono and Brewer's impact case study has changed the views and practices of government and policy-makers, interest groups, third sector organisations and UK research funders about free childcare policy. Brewer gave advice to the Scottish Fiscal Commission on their models for forecasting tax revenues and social security spending in Scotland, and to the National Audit Office on Universal Credit, work which was recognised in his award as a finalist in the Public Policy Category of the 2017 ESRC Celebrating Impact Awards. The strategy for achieving impact is based on dialogue with policy-makers and third-sector organisations through the MiSoC Advisory Board, policy advisory groups and knowledge-exchange collaborations and is assisted by the impact and engagement team. At the highest level of government, MiSoC researchers contributed oral evidence to two, and written evidence to eleven, Parliamentary Select Committees and All-Party Groups.

Strategy. In its successful bid for funding for 2019-24, MiSoC set out an ambitious interdisciplinary research agenda which reflects evolving socioeconomic structures and the changing policy environment. There are three main programmes each of which contains a range of projects. These are: (1) vulnerability, social insurance, and the dynamics of family finances, employment and health; (2) new members of society: the formation of capabilities in children and young adults, and social mobility and integration amongst immigrants; and (3) values, preferences and expectations. The plans involve coordinating major multidisciplinary researcher networks, one on preference and expectation formation and one on methodological innovation for social interventions, as well as maintaining and expanding existing links. We will continue to expand project funding from external sources, deepen links with policymakers and widen knowledge exchange activities.

Understanding Society. This multidisciplinary research centre focuses on the UKHLS. The economics group, headed by Rabe, includes Brewer, Crossley, Delavande, Del Bono, Etheridge, Fisher, Francesconi and Fumagalli, and has a range of links to other researchers within Essex and internationally. In REF2014, the UKHLS had recently superseded its predecessor, the British Household Panel Study. The goal then was to develop new insights made possible by exploiting the greater sample size for the study of subgroups, including the ethnic minority boost, as well as the richer set of variables ranging from attitudes and behaviours to linked administrative data on health, education and income. One particular aim was to expand the range of interdisciplinary research that the UKHLS makes possible (e.g., the use of biomarkers).

Achievements and Impact. In 2014-19, Understanding Society recorded 51 working papers, often on measurement and methodology. Examples include Holford on survey design, Fisher and Fumagalli on household income data and Brewer, Fisher and Fumagalli on household income volatility. Brewer, Crossley and Fisher exploited different technologies to improve the measurement of household finances, focusing on saving and borrowing. Experience with the UKHLS, methodological synergies and MiSoC support provided valuable underpinnings for the impact case study by Rabe, Del Bono and Brewer. Their studies, based on a large administrative dataset, provided the first evidence of the effects of the introduction of free part-time pre-school on child development and household labour supply. Other policy-relevant research includes the Nuffield Foundation-financed study by Holford and Rabe, which found that the introduction of universal free school meals for infants significantly reduced child obesity. The results were presented to the Cabinet Open Innovation Team, representatives of the Departments of Education and Health as well as several MPs.

Strategy. Future research will exploit new dimensions of rich data sources and extend interdisciplinary collaborations. One example is an ongoing project by Rabe and others, which links children in the UKHLS with administrative data on school inspections to estimate the relationship between perceived school quality and family educational input. Another project will use the Youth Panel to explore the development of social and emotional skills in adolescents. Francesconi will use the biomarkers data collected in the UKHLS to deepen our understanding of fertility decisions. Since April 2020, the UKHLS has conducted several short surveys that cover the changing impact of COVID-19 on the welfare of individuals, families and wider communities. Many papers have already been produced (e.g., Crossley et al., Burdett et al., Etheridge et al.).

CeMPA. Led by Richiardi. With a core team of 12 researchers and administrative support staff, the successor to EUROMOD links with colleagues in Economics as well as those in Mathematics, Computer Science, Data Analytics and Sociology, and others from leading institutions around the world. CeMPA research, which focuses on a wide range of distributional issues, uses two tools developed over the years that are offered open source to the scientific community, with a broad range of models and applications: the static microsimulation platform EUROMOD, now jointly developed with the European Commission, and the dynamic microsimulation platform JAS-mine.

Achievements. EUROMOD has become hugely influential, providing a range of important contributions that have been used to develop policy across Europe. Since 2014, members of the EUROMOD network have produced 124 working papers related to a wide variety of topics and 67 publications in economics and policy journals, including methodological advances in agent-based modelling (Richiardi JEDC 2015, 2017). Key developments include adding a wealth and household finance module, supported by Horizon-2020, and adapting the model for 'nowcasting' the risk of poverty, in collaboration with Eurostat. Wide-ranging improvements to the UK model include separate analyses of England, Scotland, Wales and Northern Ireland. On the international level, a UNU-WIDER-financed project extended the EUROMOD platform for use in countries in Africa, South America and Asia.

Impact. EUROMOD's work on the effect of fiscal austerity on income inequality showed that UK tax/benefit policy changes from 2010 to 2014 implied losses for the poor and gains for the rich, with no reduction in the deficit. Presented at a conference at Essex, the results were reported widely in

the press. The tool is now embedded in the work of both the House of Commons Library, who reviewed the Conservatives' 2019 plans to cut income tax rates for higher earners, and the Scottish Parliament Information Centre, who have provided EUROMOD-based estimates of the costs and effects on child poverty of its proposed reforms to members of the Scottish Parliament. EUROMOD results on the distributional effects of fiscal policies across Europe were the focus of a conference at the European Commission in Brussels in 2015, which was attended by over 150 policy makers from government departments and ministries from across Europe. EUROMOD analysis has been used by the European Commission in DG-EMPL's annual publications *Employment and Social Developments in Europe* (2012, 2014, 2015, 2016, 2018), in DG-TAXUD/DG-ECFIN annual reports *Tax Reforms in EU Member States* (2014, 2015), in *Tax Policies in the European Union* (2016) and in several Country Reports. In 2018; the World Bank's flagship report on the European Union (*Growing United*, World Bank 2018) used EUROMOD results to analyse growing divergence between countries in labour market outcomes.

Strategy. The activities of the new Centre are structured around three core streams: UKMOD and WORLDMODS, rooted in the static tax-benefit modelling approach, and DYNAMODS, evolving from the dynamic microsimulation and agent-based modelling tradition. UKMOD and WORLDMODS follow directly from the EUROMOD experience and mark a new focus on non-EU models. DYNAMODS is a galaxy of dynamic models following common components, with the distinctive feature of integrating static tax-benefit calculators within a dynamic context and merging dynamic microsimulation and agent-based techniques. A key feature of the Centre, embedded in the EUROMOD and JAS-mine microsimulation tools, is a cross-country comparative perspective, now extended beyond EU member states. Our aim over the next REF cycle is to invest intensive effort to access external grants and strengthen collaborations between CeMPA researchers and economists in MiSoC and Economics.

2. People

Staffing strategy and staff development

Staffing Strategy

Hiring Policy. Our long-standing policy of attracting researchers with the potential to become leaders in their field of expertise remains the key element in maintaining our research excellence. We always seek to appoint creative economists with the skills and motivation to successfully pursue the most ambitious research agendas. While we do not target narrow research areas, we look for researchers who create synergies with existing research groups and contribute to maintaining a rich, dynamic and vibrant research environment.

Recruitment. Since REF2014, we have made 27 new appointments to permanent posts, 23 at the junior level. The high volume of appointments is partly due to expansion and partly to replace those who have developed outstanding research portfolios in the Essex environment and then moved on. Examples include Alan, Crossley, Delavande, Galeotti, and Oliveros. In total, ten of the departures were to opportunities overseas. Inspiring research leadership at the senior level has been maintained through strategic professorial appointments (Cornelissen, Friedman, Gottardi, Richiardi) and promotions (Carillo Tudela, Del Bono, Mastrobuoni, Mengel, Rockett, Weidenholzer).

Our future strength in depth is assured by the recruitment of a highly talented cohort of ECRs from leading graduate programmes. They include (by cluster): Erlanson, Kuvalekar and Siemroth (Microeconomics); Clymo, Mayr, Mueller and Wang (Macroeconomics); Sakarya (Econometrics); Baysan, Holford, Lippman, Reynolds, Serafinelli, and Spantig (Applied Economics). As indicators of high quality, Baysan was awarded a Harvard Weatherhead Fellowship (2018); Siemroth won the Unicredit EconJobMarket best paper award (2015); and Spantig won the prize for best PhD thesis on experimental economics in Germany (2018). All have flourished in the Essex environment and are developing impressive research profiles. Nineteen were appointed after 2016 and most have at least two publications in leading refereed journals.

Staff Development

The UoA is deeply committed to fostering the professional development of its staff through ready access to feedback and mentoring, training and leave, especially for ECRs. New junior members of staff are allocated relatively light teaching loads (formalised in the workload allocation model), minimal supervisory responsibilities, and are given priority for research leave and conference funding.

Probation and Promotion. Probation and promotion procedures include a rigorous assessment of research performance as a key part of the process, which is guided by the PVC (Research) and scrutinised by Faculty and University committees. For probationers, senior staff act as mentors with a brief to provide advice that is supportive, objective and critical if necessary, in annual reviews of research plans. The aim is to foster early research success followed by rapid career development and progression. Of those who were junior members of staff in 2014, or have been appointed since then, Campaniello, Condorelli, Gupta, Parey and Rabe were all promoted to Senior Lecturer/Reader.

Training and Support. New members of staff undergo a comprehensive programme of induction training provided by the University's Organisational Development team. Ongoing support is also provided for: integrity training aimed at developing appropriate ethical awareness and knowledge; open science training to optimise knowledge exchange and dissemination, conferences and academic visits; framing and drafting grant proposals; mentoring junior staff and overall performance management. The University's *Future Leaders* programme provides career progression training for ECRs while the *Strategic Leaders* programme fosters leadership potential at more senior levels. In addition, the UoA provides targeted training on research funding and proposal writing, communication skills, writing for publication and effective use of statistical software. The internal allocation of funds for travel and research is slanted towards junior researchers.

Research Leave. The University provides generous support in the form of one term's research leave after six terms of service as well as supporting requests for periods of unpaid leave of absence. The UoA also encourages grant-funded research buy-outs. Staff who have been at Essex since the last REF have taken an average of six terms of paid or unpaid leave over the six-year period, often for visits to leading international universities.

Research students

PhD students are an essential part of the Essex research environment and they are fully integrated into the academic life of the UoA. We are part of the South East Network for Social Sciences (SeNSS), which is one of the ESRC's Doctoral Training Partnerships. Our unique expertise in applied economics and quantitative social sciences provides a stimulating and supportive environment for doctoral students and future researchers. This helped Essex achieve Q-Step affiliate status in 2015, which strengthens quantitative methods training at all levels, while UKHLS data are used in our research-led postgraduate education.

Programme Structure. We have continued to enhance quality and depth of our postgraduate training in order to give students the best possible start in their careers. One element is the introduction in 2015 of a Master of Research (MRes), as part of a 1+3 programme that focuses on developing research skills and provides a strong foundation in theory, methods and applications for progression to the PhD. Most students now enter the 4-year MRes/PhD programme. During the first PhD year students take two PhD-level courses from a choice of Macro, Micro and Applied. During that year, they also match with supervisors, develop a research proposal and embark on their first chapter. Progression is carefully monitored: students must pass the MRes to proceed to the PhD programme and must pass the PhD courses and produce a viable proposal in order to proceed to the research stage. As a result of progressive improvements in the programme, the completion rate in four years has increased from less than 50% in 2013/14 to 86% in 2018/19.

In the research phase, the work of PhD students is overseen by an experienced principal supervisor with shared interests who, in regular meetings, provides advice and support and steers the student to completion. A second supervisor provides additional support. Each student has a supervisory panel (two supervisors and one chair), which meets twice a year to review progress relative to targets and from which students receive written feedback. A report is passed on to the Research Student Progress Board, chaired by the Graduate Director (Research), to review and monitor progress against specified milestones. Students are required to give at least one presentation per year to the Research Student Seminar (RSS), the first of which is the thesis proposal. The RSS is attended by members of staff with cognate interests or expertise and written feedback is provided on both the content and the presentation. All students are expected to attend and are encouraged to comment on the work of others.

Student Integration and Support. Doctoral students participate fully in the research environment. This includes attending internal and external seminars, joining staff members in study groups and interacting with visiting speakers. On a broader level, students have access to the annual Essex Summer School in Social Science Data Analysis as well as to other skills courses through the University's *Proficio* programme. In April 2020, we hosted the Royal Economic Society Easter Training School on 'Media, Political Economy and Development' (presented by La Ferrara). This is part of an arrangement with the RES established in 2016. Previous editions included Randy Wright presenting on liquidity (2019), De Loecker and Syverson on productivity, firms and markets (2018), Griffith, Macchiavello and Nevo on applications of empirical industrial organisation methods (2017), and Manski and Wolpin on microeconomic analysis of public policies (2016). The Easter School is an advanced cutting-edge training activity for our own PhD students as well as a public good available to students in all UK universities, early career lecturers and postdoctoral researchers.

Many Essex graduate students also develop their teaching skills by becoming Graduate Teaching Assistants, which provides valuable experience for future academic careers. They work closely with module leaders and they are strongly encouraged to engage with the University's *CADENZA* process (accredited by the Higher Education Academy).

During their research, PhD students are also encouraged to access opportunities to forge links with external expert groups. These include visits/fellowships at universities such as Boston College, Collegio Carlo Alberto, EUI, University of Michigan, UC Davis, UC San Diego, UC3M, as well as diverse organisations such as ZEW and IZA (Germany) and the UK Cabinet Office. As one example, Costas Fernandez took a three-month secondment to the UK Migration Advisory Committee (MAC) to write a paper on immigration and productivity that featured in a MAC Report (EEA Migration in the UK, September 2018), which in turn fed into a Home Office White Paper on Post-Brexit immigration policy. Some gained experience in field work, for instance Kazakova, Montesor, Poquillon and Railland helped to conduct surveys and experiments in Tanzania for a project led by Nolen. Others were engaged in projects such as EUROMOD (Fumagalli, Tumino).

Joint Work. The integration of PhD students often results in joint research projects with staff. Examples include: She (with Carillo Tudela) on the cyclicalities of career changes (EER 2016), Mumcu (with Alan) on gender stereotypes in the classroom (REStat 2018); Moghaddasi Kelishomi (with Coles) on job destruction and unemployment (AEJ-Macro 2018); James (with Francesconi) on the effects of binge drinking (EJ 2019); Ambashi (with Rockett) on grantbacks, territorial restraints and innovation (Int J Ind Org 2019); Albertazzi (with Mengel) on benchmarking information aggregation in markets (R&R at EER); Zhang (with Chambers) on time-varying parameters and heteroscedasticity in continuous time systems (submitted); Ciani (with Francesconi, Delavande and Etheridge) on expectations of pension reform (ongoing); Costas Fernandez (with Mohnen) on social mobility in Victorian England and Wales (ongoing).

Recruitment and Further Support. We have endeavoured to be selective in recruitment and so the numbers entering the PhD programme have remained steady, not least because most students, even those with masters-level qualifications are offered entry only to the 4-year programme. Over

the REF period, student funding has become more difficult. Some of our students have been supported by ESRC and Eastern Arc studentships, as well as Essex-specific Doctoral studentships and Silberrad awards (roughly 8 students per year, or about two-thirds of our annual average intake). As available funding has decreased, we have increased our support by streamlining the process of directing applicants to sources of finance and combining sources of partial support. We have also promoted dialogue with potential supervisors at the application stage in order to improve match quality and maintain conversion rates. As preparation for the job market, final-year students give a job market seminar with staff members in the audience and do a job market mock interview with senior members of staff.

The skills developed at Essex have provided our students with a springboard into rewarding careers. From 2014 to mid-2019, 55 students were awarded PhDs. Of these, 35 are currently in university teaching and/or research positions, 17 of them in UK universities including Cambridge, CEP (LSE), Exeter, Manchester, Nottingham, Oxford, Royal Holloway, Surrey, Sussex, UCL (CReAM) and York. Others used their skills in careers at organisations, such as central banks (3), the World Bank (2), government departments, commercial banks and NGOs concerned with finance and development. Over the period, eleven students gained valuable experience for future careers through initial temporary teaching appointments at Essex and two were appointed to ongoing research positions in ISER (Fumagalli and Holford).

Equality and Diversity

Overview. At Essex we take pride in being a 'global community' and economics is a leading example of the diversity that this implies. Promoting equal opportunity in all aspects of University life while respecting diversity and avoiding bias are principles that are deeply embedded in our institutional culture. This is particularly strong in the economics community, not least because discrimination and bias is understood to be inefficient. These principles are applied at all levels: for students in admission, assessment and progression procedures, and for staff in hiring, training and promotion procedures as well as in research support and arrangements for flexible working. We share in the Institutional Athena SWAN Bronze Award and at the UoA level we have deepened our commitment to gender equality during departmental Athena SWAN processes. We also have accreditation for the use of the 'Disability Confident (formerly 'Two Ticks') Employer symbol and our policies on race equality/LGBT go deeper than existing legislation.

Our commitment to equality and diversity is also reflected in our research, a significant proportion of which relates to diversity. Studies of gender gaps include: Mengel on gender gaps in university teaching evaluations; Coles and Francesconi on equal opportunity legislation; Francesconi and Parey on graduate pay gaps; Nolen on gender differences in risk aversion; Alan and Kubilay on willingness to take on leadership and social skills; Lippman on gender quotas and institutions; and Bhalotra on female legislators, maternal depression and domestic violence. Studies of other diversity aspects include Hatton on asylum seekers, Cornelisson on those from disadvantaged backgrounds, and Kubilay on ethnic segregation in schools. It also extends to our graduate students, where PhD theses have included gender and labour supply (Montessor), co-ethnic partnerships in the labour market and immigrant assimilation (Giua), and disability (Morciano).

Faculty Composition. Our faculty has become more diverse since REF2014. This is reflected in an increase in the proportion of women returned to the REF. In REF2014, we returned 34 staff of whom seven were women (21%). In this framework, out of 54 staff, 15 are women (28%), who account for 30% of the output submitted. Of those, four are professors, five are senior lecturer/readers and six are lecturers (or equivalent). These account, respectively, for 25%, 28% and 30% of the faculty at each grade, so there is not much evidence of a 'leaky pipeline' in career progression for women. Among the current faculty, eight women have been appointed since the last REF (Baysan, Campaniello, Jiang, Kubilay, Mohnen, Sakarya, Spantig and Xie), 30% of permanent appointments. And over the same period five women have been promoted, three to Professor (Del Bono, Mengel and Rockett). One quarter of the faculty returned to REF2021 is BAME (13 out of 54 compared with three out of 34 in REF2014), contributing 30% of the output submitted.

Hiring Process. We require that each hiring committee includes at least two women (out of four or five members). Members of the hiring committee are required to have completed courses in Equality, Diversity and Inclusion (required for all members of staff) as well as in Unconscious Bias, and we ensure compliance. We strongly promote awareness of the nine protected characteristics in the Equality Act (2010). All members are encouraged to view the applications for academic posts at every level and to make recommendations for the longlist. While academic quality is uppermost in the shortlisting of candidates, we insist that minority-background and female applicants are well represented.

Career Progression and Promotion. For probationary staff, a formal agreement is made according to a set template in which interim and final targets are specified, subject to opportunity. These agreements are drafted jointly with a mentor, overseen by the Head of Department (HoD) and are subject to approval by the Executive Dean. As part of this process, probationers are required to undertake equity and diversity training which is provided at the University-level and to make an 'active contribution to an inclusive community in which diversity is embraced and celebrated' (*Guidance for Probationary Academic and Research Staff*, p. 5). For all research staff there is an annual review of research progression coordinated by the Research Directors, which is a diversity-informed supportive process that covers outcomes, pipeline, funding and impact. Support for junior women is reflected in the establishment of the network for junior female economists in 2019.

Workloads and Flexible Working. Our staff induction programme provides information on flexible working policies, which include paid leave and advice on maternity/paternity/adoption. New junior staff select a mentor they feel comfortable with, who helps to adapt the common departmental template to fit the probationer's personal circumstances. For all staff, the University has policies that support childcare and phased return to work as well as special support for caring and compassionate leave. These policies are supplemented at the departmental level by accommodating requests to concentrate teaching loads across the academic year and by day of the week in order to fit the individual's circumstances. The informal flexible working culture of the UoA includes rescheduling meetings or using Skype/Zoom and ensuring that seminars are set at family-friendly times. On a more formal level, our workload allocation model ensures fairness over a comprehensive range of tasks while accommodating individual needs by allowing substitution between tasks.

3. Income, infrastructure and facilities

Income

In its report on the REF2014 submission, the Sub-panel noted that our success in raising research income was particularly impressive. This outstanding performance has continued during the current REF period. The Essex UoA raised over £32 million in research funding from both public and private sources. This figure includes the share attributable to economics of the continuing ESRC support for UKHLS and the £6.2 million ESRC refunding of MiSoC.

A few examples of major research grants to individuals include:

- ESRC New Investigator Grants to Gupta for 'Methods for Network Dependent Data' (£213,035) and to Siemroth for 'Experiments on the Effects of Trading Algorithms on Financial Markets' (£264,914)
- European Commission Grants 2018, 2019, 2020 to Richiardi for 'EUROMOD Update' (€4.9 million)
- European Commission H2020 to Richiardi for 'InGRID-2' (€903,176)
- Office for Students grant to Rabe (with others) for 'Reducing Socio-Economic Inequalities in HE Participation: The Role of Information, Peers and Mindset' (£278,000)

- ESRC grant to Chambers (with Taylor) for 'The Analysis of Non-stationary Time Series in Economics and Finance: Cointegration, Trend Breaks, and Mixed Frequency Data' (£350,728)
- ESRC grant to Del Bono (with Delavade, Parey) for 'Subjective Expectations, Preferences and Access to Information' (£900,211)
- ESRC-DFID grant to Nolen for 'Comparative Study of Effectiveness of Alternative Poverty Eradication Interventions' (£265,000)
- European Research Council (ERC) starting grant to Mengel for 'Opinion Dynamics' (€830,632)
- British Academy grant to Bhalotra for 'Welfare Dependence and Poverty Traps' (£311,179)

Infrastructure

Our strong performance in research is underpinned by the University's organisation and infrastructure. Our comprehensive organisational structure is led by the PVC (Research) and supported by the REO. The REO provides information and training on research impact, funding opportunities and constructive assistance with grant applications, oversees ethics approval and intellectual property, administers research income and monitors output. The REO also coordinates inter-University collaborations and fosters links with public and private end-users. The University provides seed-corn funding for new projects and generous department-level support for research expenses, travel and conferences.

Priority is given to providing a high level of support, especially to ECRs, for projects likely to be globally significant, impactful and most productive. Research performance (evaluated jointly by output and potential impact) is a key element in permanency and promotion procedures and is supported by an effective mentoring system. At the departmental level, research time is protected by deliberately keeping teaching loads low through the extensive use of temporary lecturers, teaching fellows and graduate teaching assistants.

Facilities

We possess a unique set of key facilities that underlie our research excellence and make Essex a major centre for interdisciplinary research.

Faculty of Social Sciences. Economics at Essex is part of the Faculty of Social Sciences and is located in close proximity to the Departments of Government and Sociology, top ranked centres of research excellence. This large pool of expertise and overlapping interests fosters and facilitates cross-fertilisation of ideas across disciplines, which is shared both by staff and students.

Institute of Social and Economic Research. With assured financial support for the next five years, ISER is an integrated interdisciplinary research hub that houses MiSoC, Understanding Society and CeMPA. Internationally renowned for the production and analysis of longitudinal surveys, it is also a world leader in the development of survey methodology and data analytics. In particular, the UKLHS is the world's largest longitudinal household panel study of its kind. In addition to collecting detailed social and economic circumstances, attitudes, lifestyle, health and family relationships, it has been augmented with biomarker and genetic data as well as with neighbourhood characteristics.

ExCESS and EssexLab. ExCESS provides world-class research facilities and technical support, essential for researchers designing experimental studies, and is closely affiliated with EssexLab. Launched jointly by Economics and Government in 2013, EssexLab is one of the largest and best equipped experimental labs in the UK. Led by Nolen until his death (October 2020), the lab has 34

workstations with state-of-the-art equipment and software, a mobile wireless lab with 34 high-spec tablets and an extensive subject database. It has 14 networked computers fitted with the new iMotions software and is acquiring biometric facilities that allow researchers to use GSR, ECG and eye tracking as part of their research.

PhD Laboratory. The UoA shares with the Department of Government a recently upgraded PhD laboratory that includes dedicated space for small-group work. This also provides access to Arthur, a modern ultra-fast central computing system with multiple processors, each with 24 cores, which contains a wide array of software and facilitates high-performance multi-dimensional computing and management of large datasets for Economics and ISER's doctoral students and faculty.

University-wide Facilities. Used extensively by staff and doctoral students, these include (a) the Albert Sloman Library with 1.2 million volumes, over 30,000 journals and 300 databases as well as a range of special collections; (b) the UK Data Archive, the UK's largest collection of social, economic and population data, which affords secure access; (c) the cross-campus Institute for Analytics and Data Science, specialising in Big Data; (d) the ESRC Business and Local Government Data Research Centre (part of the Essex Knowledge Gateway); and (e) the Essex Summer School, the largest Social Science Research methods training programme in the world.

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

Dissemination and Collaboration

Essex economists maintain high visibility through wide dissemination of research and policy papers, engagement in conferences, policy forums and through involvement in the organisation of conferences and workshops at Essex and elsewhere. Much of our applied research is also disseminated monthly through ISER's highly popular blogs, podcasts and briefing notes.

Dissemination. The dissemination of our research is broad and highly visible. Besides seminars, workshops and conferences, it is presented to a wider audience through websites such as VoxEU (Bhalotra, Cornellissen, Del Bono, Francesconi, Hatton, Jiang, Mastrobuoni, Mueller, Nolen, Richiardi, Rockett, Serafinelli, Wang), and IZA World of Labor (Campaniello, Hatton, Rabe). Senior members are often invited to give keynote addresses and plenary lectures. As examples, Francesconi gave the presidential address at the European Society for Population Economics Conference (2017) and plenaries at the Italian Association of Labour Economists (2017) and Moscow's Higher School of Economics (2019); Mengel gave keynotes at the Economic Science Association, North American meeting (2020) and the NYU Abu Dhabi Symposium on Experimental Economics (2018); Hatton gave the Giblin public lecture at the University of Tasmania (2015), and plenaries at the Economic History Society Conference (2016) and at Lund Population Day (2016); Coles gave the keynote at the Search and Matching annual conference (2018); and Bhalotra gave keynotes at the Nordic Conference in Development Economics (2018), the European Public Choice Society Conference and the Italian Development Economics Summer School, as well as ten other academic meetings.

Guest Speakers and Visitors. A large number of academic visitors regularly contribute to our vibrant research environment, often invited specifically to match our developing interests and foster existing or future collaborations. These take a range of forms:

- (a) In addition to our lively internal seminars and cluster-specific reading groups, our external seminar series has grown from two to five seminars a week. In total, these average more than 100 external speakers per year.
- (b) We have organised more than 40 conferences and workshops with international participants. These include the annual workshops on Search and Matching, Applied Microeconomics and Family Economics as well as workshops on topics such as health, crime, education, experiments, subjective expectations, finance and development. As one example, we hosted the UK (now European) Causal Inference Meeting in 2017.

Interdisciplinary conferences based around the UKHLS and EUROMOD and on issues such as biomarkers and migration also attract a wide range of international participants.

- (c) We have hosted a range of eminent short- and long-term visitors. These include: Akbarpour (Stanford), Albrecht (Georgetown), Cerreia-Vioglio (Bocconi), Davis (Chicago), Eeckhout (UPF), Ely (Northwestern), Fabermann (Chicago Fed), Gilboa (Tel Aviv), Hawkins (Yale), Herkenhoff (Minnesota), Horner (Yale), Jarosh (Princeton), Kircher (Cornell), Manski (Northwestern), Moen (BI Oslo), Mongey (Chicago), Moscarini (Yale), Mitman (IIES), Mueller (UT Austin), Ostrovsky (Stanford), Pesendorfer (Princeton), Robin (Science Po), Samuelson (Yale), Strack (Berkeley) and Van Reenen (MIT).

Interdisciplinary Research. Essex economists have developed their research in a wide range of interdisciplinary projects, some of which have led to publications in non-economics journals. Health-related contributions include: Bhalotra on the protective effect of education on post-partum functional impairment (PLoS One, 2019) and the effectiveness of psychosocial intervention (Lancet Psych, 2020); Baysan on the effect of ambient temperature on suicide rates (Nature Climate Change, 2018) and Jiang on the impact of being rejected from blood donation (Transfusion Medicine and Hemotherapy, 2019). The diverse range of other topics includes: Argenziano on the formation of beliefs (PNAS, 2019); Mastrobuoni on invalid ballots and electoral competition (Pol Sci Res & Meth, 2016); Mengel on natural disasters and group cohesion (PLoS One, 2017); Spantig on dishonesty-shifting in groups (Man Sci, 2017); Weidenholzer on copy trading (Man Sci, 2020) and Xie on yellow taxis and road accidents (PNAS, 2017). Almost all these studies include co-authors from other disciplines. Most of the larger research projects based in ISER are also joint with non-economists. For example, in the ESRC-funded project on 'understanding household finance through better measurement', Brewer, Crossley and Fisher were joined by survey statisticians and political scientists.

Learned Societies Journals and Networks

Essex economists are held in high esteem and have engaged widely in academic networks and provided service to societies and journals.

Research Networks. Bhalotra, Francesconi and Hatton are Fellows of the Academy of Social Sciences, UK; Hatton is also a Fellow of the Academy of Social Sciences in Australia. Affiliations with leading research networks include: CEPR (Carillo-Tudela, Francesconi, Hatton, Rockett); CESifo (Argenziano, Brewer, Carillo-Tudela, Francesconi, Friedman, Gottardi, Rabe), IZA (Brewer, Campaniello, Cornelissen, Carillo-Tudela, Del Bono, Francesconi, Hatton, Holford, Mastrobuoni, Rabe, Serafinelli), IFS (Brewer, Etheridge), Uppsala Center for Fiscal Studies (Brewer) and CHILD (Francesconi).

Editorial Service and Societies. Essex economists hold 30 editorships, associate editorships and editorial board memberships of international peer-reviewed journals such as *Economic Journal*, *Journal of Economic Theory*, *European Economic Review*, *Journal of Economic Behavior and Organization*, *Economica*, *Journal of Industrial Economics*, *Labour Economics*, and *Review of Economics of the Household*. They have also served on the programme committees of a wide range of prestigious international conferences including those of the Royal Economic Society, the European Econometric Society, the Latin American Econometric Society, the European Association of Labour Economists and the European Society for Population Economics.

Contribution to the Research Base

UKHLS. During the REF2021 period, the UKHLS has been used in more than 1800 research papers, which often involve interdisciplinary work. It has become the basis for a wide network of collaborations. Over this REF cycle, the UKHLS team has run 54 workshops (at Essex and elsewhere in the UK), which are open to participants, researchers and policymakers on topics ranging from basic introductions to key features of the data, panel data methodology, and topics such as poverty, social inclusion and issues concerning ethnic minorities and the use of

biomarkers in social science research.

EUROMOD/JAS-mine. EUROMOD is the most used tax-benefit microsimulation platform in the world, which originated tax-benefit models for 47 countries. JAS-mine is a platform for dynamic microsimulation and agent based modelling used by researchers around the globe. CeMPA holds an annual programme of events, including summer/winter schools and an annual training event, held at Essex or joint with partner institutions in Vienna, Antwerp, Tallinn and Johannesburg. It also includes the annual project meeting with partners in the network and a range of conferences and workshops including from 2021 a School for Advanced Microsimulation Studies to provide short courses on microsimulation and agent-based modelling.

ExCESS and EssexLab. EssexLab has become an extremely important platform for widening access and launching large experimental projects as well as promoting interdisciplinary research. It has been used by researchers from many UK universities, including, Edinburgh, Bath, Bristol, LSE, Oxford and Nottingham, as well as from overseas universities such as Bonn, Brown, Chicago, UC Davis, EUI, and SHUFI (Shanghai). It has also started to attract interest beyond the university sector, for example from Coast Digital and Essex County Council.

Economy and Society

Essex economists engage widely with public- and private-sector organisations and the wider public on economic issues relevant to them.

Public Profile. Nine members have published in *The Conversation* (Bhalotra, Brewer, Campaniello, Francesconi, Hatton, Mastrobuoni, Nolen, Rockett, Siemroth), a process now augmented with the establishment of MiSoC 'Explainers' (Del Bono, Delavande, Holford). Essex research frequently attracts the attention of the wider media. Mengel's analysis of the gender gap in teaching evaluations was reported in a range of media outlets including *The Economist*, and was tweeted more than 2000 times. Other examples include Francesconi on binge drinking (reported in 20 newspapers and cited in *House of Commons, Hansard*), Baysan on suicide (CNN, *San Francisco Chronicle, Scientific American, The Guardian, Time, La Tercera*), and Mastrobuoni on Mafia crime and predictive policing (20 newspapers including *The Times* and *The Economist*, and BBC News). Many others have provided expert commentary to the media. Examples include Holford on higher education and graduate pay (two *New Statesman* events and interviews on Talk Radio, LBC, BBC national and local radio and CBC TV). Brewer, Del Bono and Rabe's research findings are regularly mentioned in mainstream media and online.

Engagement with Institutions. MiSoC policy advisory groups provide face-to-face links with user organisations, including the Scottish Government, BEIS, HMT, DHSC, Home Office, DWP and DfE as well as more than 30 devolved public offices, NGOs and think-tanks. Individual members have also developed relationships with a range of organisations, presenting their research findings and using their expertise to provide advice. For example, Brewer provided evidence on income inequality and universal credit to the Resolution Foundation (which he has subsequently joined as Chief Economist and Deputy Chief Executive); Smith was a member of the Essex Economic Commission; and Nolen advised the Nudge Unit of the Cabinet Office. Bhalotra was an expert panellist on Global Inequalities at the British Academy (2017) and on Sustainable Development at the International Investment Bank (2018) as well as presenting her research on violence against women at Action-Aid (2014) and on adolescence at UNICEF (2017).