Institution: The University of Manchester

Unit of Assessment: 23 (Sociology)

Title of case study: Impact of Demographic Projections on Sub-national Planning

1. Summary of the impact

Research on demographic projection methods, undertaken at the University of Manchester (UoM), provided the basis for POPGROUP, a software package recognised as the industry standard for local demographic planning in Great Britain and adopted by the Local Government Association (LGA) in 2010. Three impacts emerge from POPGROUP. Firstly, in estimating how migration will be restricted or stimulated according to the provision of housing, the software permits local government to assess a range of house-building scenarios, enabling the effective implementation of, most recently, the 'National Planning Policy Framework' (2012). Secondly, by extending demographic projections to areas other than local authority boundaries, it enables national statistical agencies to project demographic demand (e.g. in National Parks). Thirdly, the ubiquity of POPGROUP has led to the increasing use of demographic tools within the commercial sector.

2. Underpinning research

This programme of research originated in the late 1990s when Professor Ludi Simpson (1992-2008, now Honorary Professor of Population Studies) worked in the local authority sector (Bradford Council) and at UoM on the 'Estimating with Confidence Programme' (ESRC/ALCD). At UoM the research has been led by Simpson, with contributions from Dr Christian Brand (Research Associate, 2003-2006, 2007-2012), Susan Lomax (Research Assistant, 2007-2009) and Dr Alan Marshall (Research Associate, 2010-2011, 2012-).

Research on demographic projection methods underpins the POPGROUP software; developed to forecast population, households and the labour force, for areas and social groups. Demographic projections calculate future population size and structure based on assumptions about future trends in fertility, mortality and migration. The distinctive nature of the research contribution rests on the **improved use of cohort component models** (which use information on fertility, migration and mortality trends within age-sex cohorts) for strategic planning, through better integration of population estimates within demographic projections. POPGROUP was designed by Simpson in 2000 to implement a cohort component projection model underwritten by six local authorities. It has been updated twice (v.2 in 2002; v.3 in 2005), with a further generalised Derived Forecast model issued in 2010, accommodating forecasts of any population characteristic related to age and sex, including households and the labour force. A fourth version of POPGROUP is due in 2014.

Emerging from a consideration of complex forecasting strategies, the research aimed to produce software of sufficient rigour that would convince advanced users, yet be practical and functional for non-specialist staff. Based on Excel, it builds upon users' existing spreadsheet skills, with alternative assumptions developed as scenarios. The user remains in control of the area to be forecast, of data inputs, and of analytical outputs additional to the software's own flexible reporting and graphical routines. Additionally, software development to improve quantitative training in POPGROUP methods was supported by the ESRC (2003-2008). This training recognised that previous software packages had attempted to fill the same requirements yet had either been focused on temporary needs, or had become inaccessible through inadequate support.

POPGROUP's methodological innovations include incorporating the mathematical equivalence of social groups and geographical areas, thereby satisfying both a longstanding need for local area forecasting and a growing interest in the social dimensions of population dynamics as they relate to ethnic diversity. The first version of the software facilitated user input of base populations, births, deaths and migrants, and assumptions about future rates of fertility, mortality and migration, providing tabular and graphical outputs of population structure and demographic indicators [D]. Subsequent research incorporated into the software integrated forecasts of population, housing and the labour force [E], with further

methodological innovations implementing improved algorithms for expectation of life, decomposition of population and household change, dynamic population pyramids and comparison of forecast scenarios.

Housing provision and economic development impose constraints on populations which are also resolved through migration; **hence the translation of migrants into households is a key algorithm in the POPGROUP approach**. This permits a range of complex social factors to be taken into account when constructing projections: such as the age and sex composition of migrants and the existing population; the propensity of residents of different ages to form households; the proportion of the population in communal establishments; and the proportions of vacant dwellings, shared dwellings and second homes.

A key feature of the research presented here is that it has been simultaneously incorporated into the software, and disseminated via academic outputs [A][E] (alongside updated software manuals). Specific research enabled by the software includes: an ageing population and the restricted housing of National Parks [B]; changing ethnic composition [C]; and estimation of local demographic characteristics [A], the arena where the social impact of POPGROUP is most evident.

3. References to the research (all references available upon request – AUR)

In addition to academic articles, a dissertation and a book, a range of software manuals were also produced between 2002 and 2011 and are available via the CCSR website (http://www.ccsr.ac.uk/popgroup/).

[A] (2011) Simpson, L. and Snowling, H. "Estimation of Local Demographic Variation in a Flexible Framework for Population Projections" *Journal of Population Research* 28(2) 109–127 (Special issue on small area projections) doi:10.1007/s12546-011-9060-7
[B] (2009) Marshall, A. & Simpson, L. "Population Sustainability in Rural Communities: the Case of Two British National Parks" *Applied Spatial Analysis and Policy* 2(1) 107-127 doi:10.1007/s12061-008-9017-1
[C] (2009) Finney, N. and L. Simpson *'Sleepwalking to Segregation'? Challenging Myths about Race and Migration*. Bristol, Policy Press (REF 2014) (AUR)
[D] (2007) Simpson, L. "Fixing the Population: From Census to Population Estimate" *Environment and Planning A* 39(5) 1045-1057 (RAE 2008) doi:10.1068/a38141
[E] (2004) Simpson, L. "Integrating estimates within population forecasts" *Applied Population and Policy* 1(2) 89-104 (AUR)

4. Details of the impact

Context: As population projection software has become an increasingly essential tool in planning and policy formulation within the UK, POPGROUP has become the leading software for population planning. The value of the POPGROUP software derives from its flexible framework which can be tailored to each user's own environment, with impact delivered through:

- The widespread adoption of the POPGROUP software by government and commercial planning agencies.
- The recognition of POPGROUP as the industry standard for local planning.

Users include local and national governments, health agencies, commercial planning companies and universities, with the number of organisations using the software increasing from 40 in 2008, to 111 by July 2013 (when the most recent survey took place) [1][6]. In October 2012 two-year teaching licences were issued for the first time [1]. The software continues to develop, with the addition of the generalised Derived Forecast facility in 2010, immediately utilised to implement forecasts of long-term illness and disability in 2011 [2]. Additionally, since 2010 Data Modules have been provided to fill demographic models with Government (DCLG) – and other authoritative projections from within the UK – from which users can develop in-house 'alternative scenarios'. These developments have led to a range of impacts:

1. POPGROUP has become the industry standard. Now *"recognised as the 'industry standard' population forecasting model"* [8], the Head of Population Statistics at the Welsh Assembly notes how it has *"contributed to the development of the demographic knowledge base within local authorities"* [5]. It was adopted in 2010 by the LGA, through an agreement with the Steering Committee of software users, and is presently used by 81 Local Authorities [1][6]. Simpson, in collaboration with these users, has taken the lead in designing each subsequent software development, and is now technical manager to the Steering Committee.

2. POPGROUP has facilitated the implementation of policy in socially dynamic contexts. In particular, POPGROUP addresses the UK Government's 'National Planning Policy Framework' (2012) that requires every local authority to make a 'Strategic Housing Market Assessment', supported by robust demographic projections. This is exceptionally important, as the co-ordination of such assessments by regional bodies was scrapped in 2010, as part of the UK Government's 'localism' agenda. As the co-chair of Local Authorities on the Central and Local Information Partnership notes:

> *"POPGROUP allows Local Government demographers the flexibility to examine population, household and labour force projections at a level appropriate to their needs… alternative scenarios can be quickly generated, by manipulating any of the components, and compared with previous sets. This facility is particularly useful when looking at alternative Planning scenarios for House Building as required by Local Spatial Strategies; with the abolition of Regional Spatial Strategies, this has become a key requirement for Local Authorities"* [4].

The success of POPGROUP in providing an accessible technical framework for local planning has emerged directly from the underpinning research cited, with its algorithms and understanding of common local needs across diverse circumstances providing an accessible and user-controlled planning tool.

3. POPGROUP has been used throughout the nations of the UK in socio-geographically diverse situations. The national statistical agencies of Wales, Scotland and Northern Ireland have made use of POPGROUP for their production of sub-national demographic forecasts. The Welsh Assembly Government used the software for their council area population forecasts (2010 and 2013); noting that "*POPGROUP has proved to be a useful tool in enabling government bodies such as the Welsh Government to produce demographic projections at a local authority level - this includes Unitary Authorities and National Parks"* [5]. National Records Scotland also used the software for national park population forecasts (2011), working with Simpson and Lomax to develop local ward projections. Their Head of Population and Migration Statistics confirms the value of this work:

> *"The project was in two phases the first of which was the production of projections for multimember wards for Fife Council area and the second phase was to work with National Records of Scotland (then General Register Office for Scotland) to develop the same projections in-house and to compare different methods using more detailed data. Comprehensive recommendations and guidance was produced to allow others to more easily produce their own projections for small areas. Feedback from Councils on the project and on the guidance has been very favourable. Subsequent recent follow-up work to produce user guidance for the derived forecast model was also produced to very short deadlines and within budget."* [7]

4. POPGROUP is increasingly used by commercial planning agencies. As of July 2013, six commercial organisations have purchased POPGROUP (Barton Willmore, Ecorys UK, GVA Grimley, Nathaniel Lichfield and Partners, ORS and Regeneris Consulting Ltd.) These organisations advise local authorities and housing development companies in Britain, and have turned to POPGROUP software as a 'standard' since 2010. GVA, a large consultancy firm working both for local authorities and private development agencies, underlines this recognition:

> "*POPGROUP is becoming increasingly recognised as the Industry standard population forecasting model. This is evident through the requirement to have POPGROUP expertise in a majority of the recent public sector tender opportunities we have worked on. This requirement has also stimulated the commercial sector's use of the model to interrogate and challenge published projections elsewhere. From our own experience we have used POPGROUP both to define local housing requirements as well as challenge those previously set. Our work using POPGROUP has been used to successfully justify an increase in local housing requirement in support of major housing development, by demonstrating a range of scenarios where higher housing numbers would be required."* [8]

In large part, it is POPGROUP's accessible Excel platform that has assisted wider uptake.

Ongoing engagement: In addition to these impacts, UoM's annual training course in POPGROUP – in addition to self-training POPGROUP practical modules – reflects breadth of impact. In 2013, the 18 participants came from: local authorities (9), Universities (4), national statistical agencies (3) and commercial companies (2) [9]. Moreover, international interest has been reflected in users in the United States (U.S. Census Bureau), Finland, Singapore and Malaysia, and the inclusion of POPGROUP in a 2011 review of three demographic software packages commissioned by the Latin American Population Association [10]. The influence of POPGROUP is ongoing, as upon the retirement of Simpson in 2009, Edge Analytics Ltd won a tendering process to support users and to develop, distribute and market the software. According to Edge Analytics' Managing Director, *"the contract helped the company to develop and enlarge from one to five staff by 2013, each of whom have had significant workloads related to POPGROUP"* [3]. Simpson remains the technical manager.

5. Sources to corroborate the impact (all claims referenced in the text)

[1] (2013) POPGROUP List of Users & Register of Work (2005-2010) & (2012) POPGROUP Educational License (October)
[2] (2011) 'Limiting Long Term Illness (LLTI) & Disability Projections: Data Modules for the Derived Forecast Model (Edge Analytics) (*passim*)
[3] Testimonial from Director, Edge Analytics (13th June 2013)
[4] Testimonial, Joint Chair (Local Authority), Central and Local Information Partnership's 'Population Statistics' Sub-Group (25th April 2013)
[5] Testimonial from Head of Population Statistics, Welsh Assembly Government (9th May 2013)
[6] (2013) Local Government Association 'Report of the POPGROUP User Survey' (July)
[7] Testimonial from Head of Population Statistics, National Records Scotland (3rd May 2013)
[8] Testimonial from Senior Consultant, GVA Consultancy (25th April 2013)
[9] Demographic Forecasting with POPGROUP – Future Training Flyer & Registration on recent course (16th – 17th May 2013)
[10] (2010) ALAP Evaluation '*Informe sobre Programas Informáticos para Proyecciones Demográficas*' (16th November) (pp.44-52, Spanish – English Intro)