Using POPGROUP for population and housing projections in small areas in Scotland

Ludi Simpson

June 26th 2008, Edinburgh

Steps to small area projections in Scotland

- Suitable data
  - GRO(S) data for datazones (handout is a draft)
  - Geographical conversion from datazones to suitable areas
  - Other data: Council area data as constraints; smooth schedules
- The POPGROUP user's technical tasks
  - Population in a base year and standard demographic schedules
  - Estimates of recent local differentials for fertility, mortality, migration
  - Constraints to GRO(S) projections for Council Areas
  - Running and reporting projections
- Routines for easing those technical tasks
- Households and housing-led projections

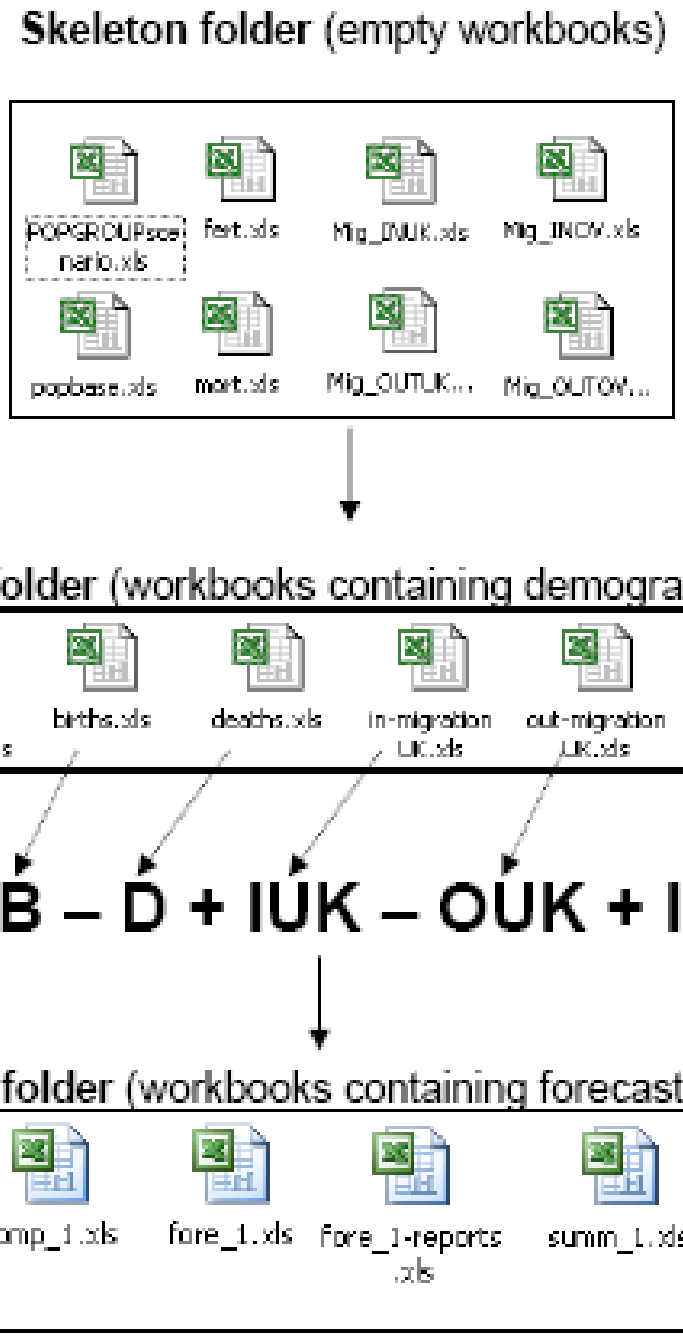
POPGROUP

SETUP

INPUTS

FORECAST

ANALYSIS



POPGROUP general approach

- POPGROUP allows the user to enter data and assumptions as rates or counts or a mixture of the two, with very few restrictions.

- (i) An initial projection of births, deaths and each migrant flow is based on rates and differentials
  - Age **schedule** of rates, any **differentials** found on the other sheets, and any values of **TFR, SMR or SMigR**. This initial estimate is specific to single year of age, sex, and group, for the current forecast year.
- (ii) Any count(s) over-ride the initial values.
  - The initial values are scaled to agree with the given **counts**. The initial counts always influence the single year age structure of deaths and migrants, as the user cannot give counts detailed to single year of age.
- (iii) Population, housing and jobs constraints trump all
  - The migration counts from (i) and (ii) become provisional and are altered again to meet the **constraints**.

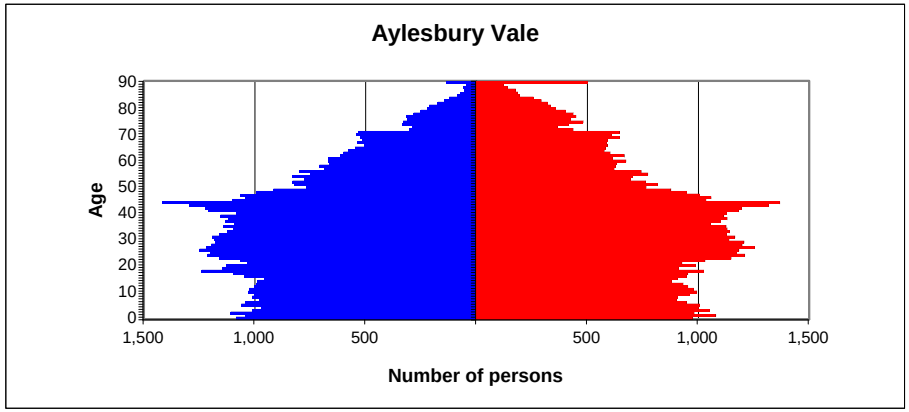
- Outputs
  - Are calculated using the final post-constraint age and sex specific values, which are then retained on the optional ”-dump” file.

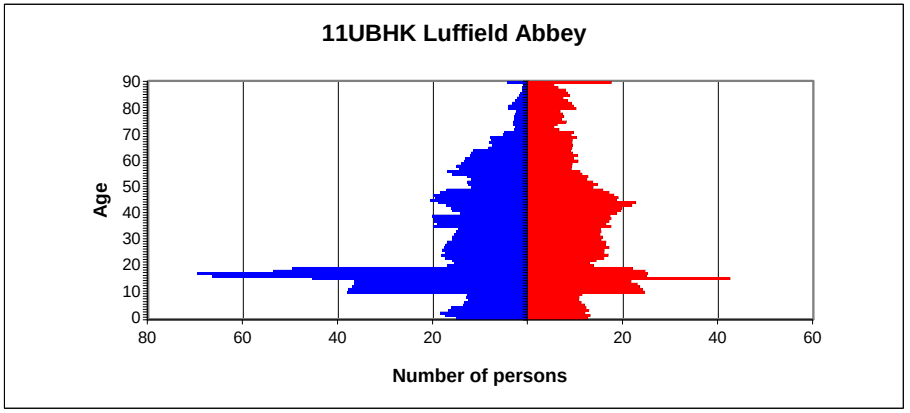
- (from manual 6.1)

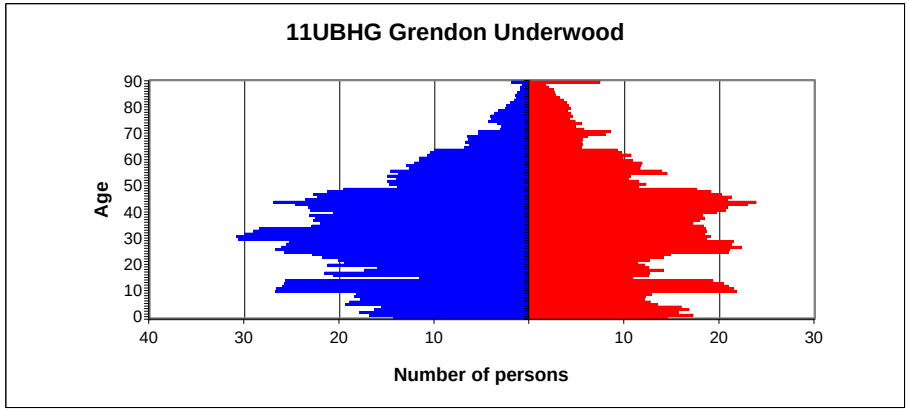
Aylesbury Vale and three of its electoral wards

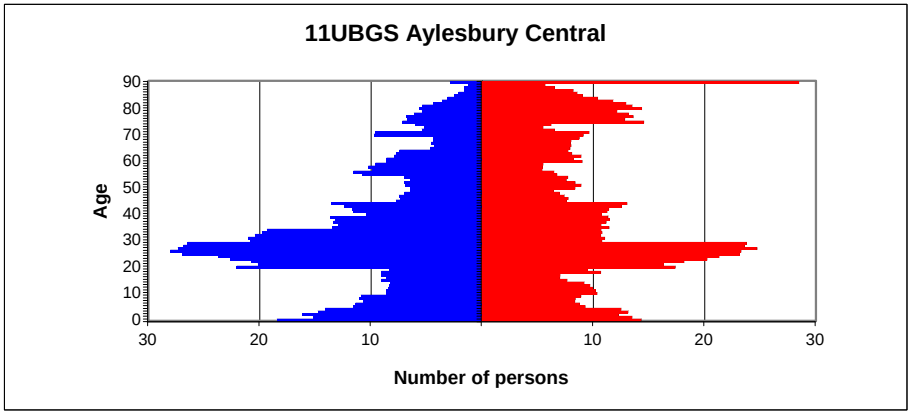
Buckinghamshire County Council: Age Pyramids for base year 1991

Males are blue; females are red

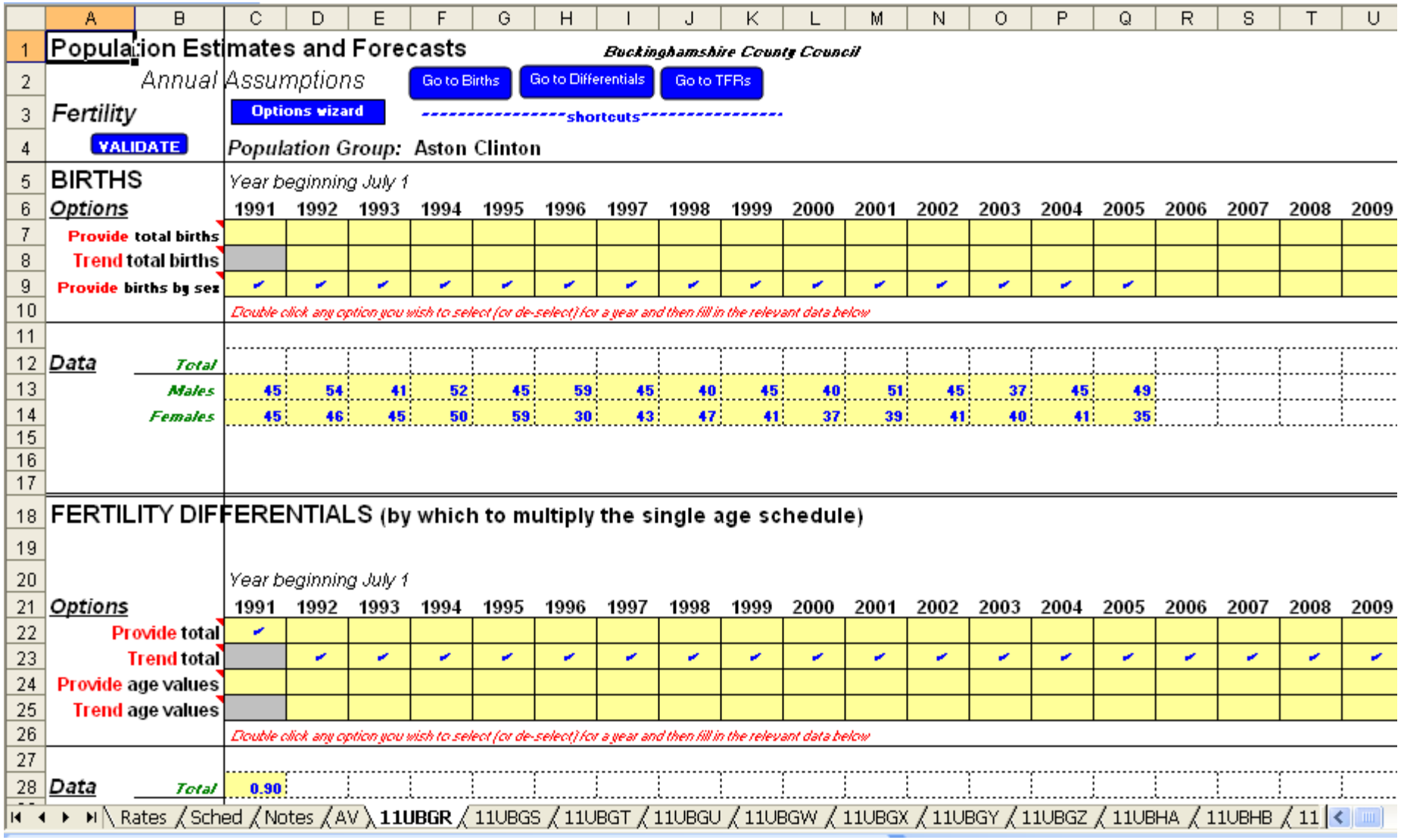








A POPGROUP file



Population Estimates and Forecasts — Buckinghamshire County Council

Annual Assumptions

Go to Births | Go to Differentials | Go to TFRs

Fertility — Options wizard — shortcuts

VALIDATE

Population Group: Aston Clinton

BIRTHS

Year beginning July 1

Options	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Provide total births																			
Trend total births																			
Provide births by sex	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔				

Double click any option you wish to select (or de-select) for a year and then fill in the relevant data below

Data	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Total																			
Males	45	54	41	52	45	59	45	40	45	40	51	45	37	45	49				
Females	45	46	45	50	59	30	43	47	41	37	39	41	40	41	35				

FERTILITY DIFFERENTIALS (by which to multiply the single age schedule)

Year beginning July 1

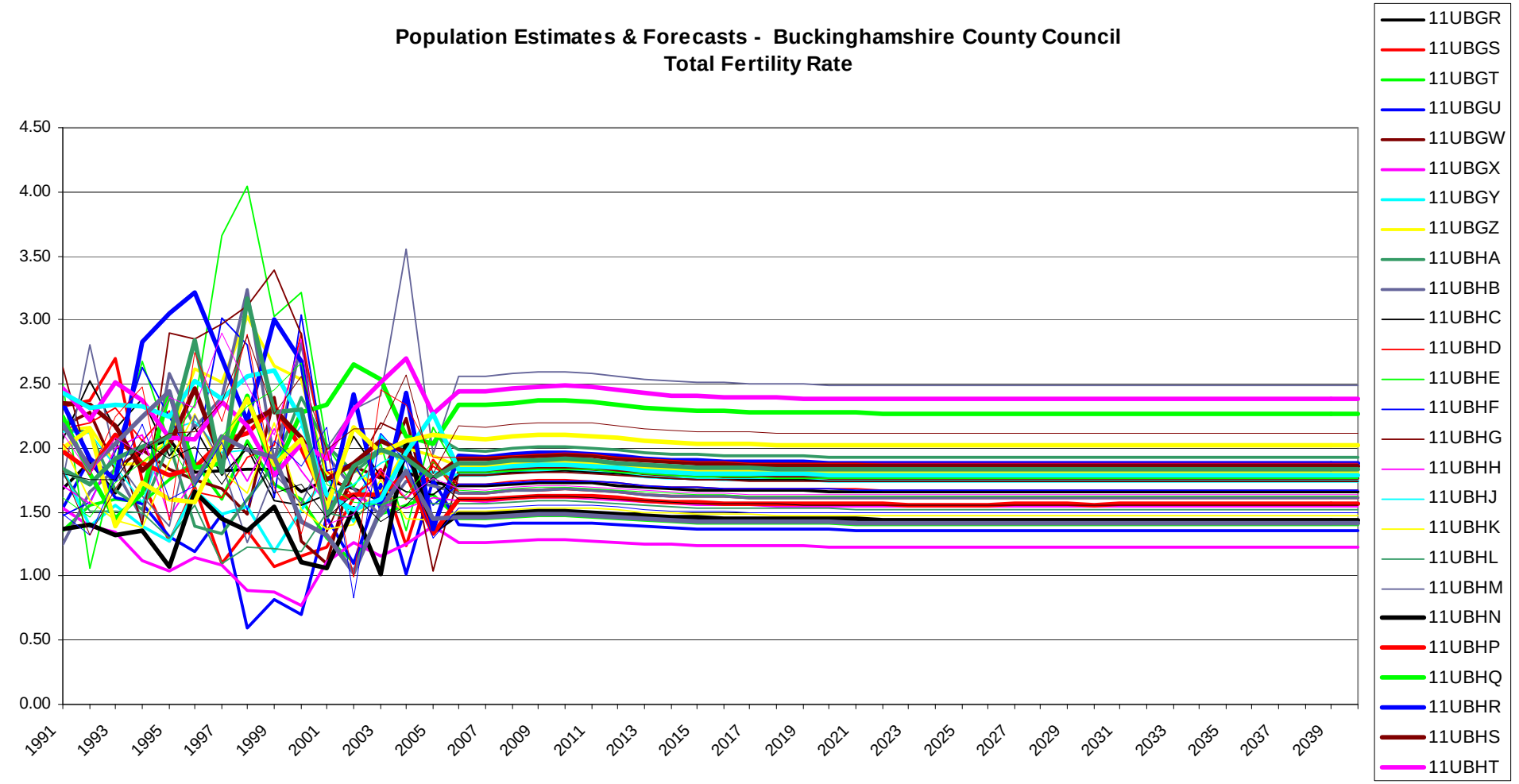
Options	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Provide total	✔																		
Trend total		✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Provide age values																			
Trend age values																			

Double click any option you wish to select (or de-select) for a year and then fill in the relevant data below

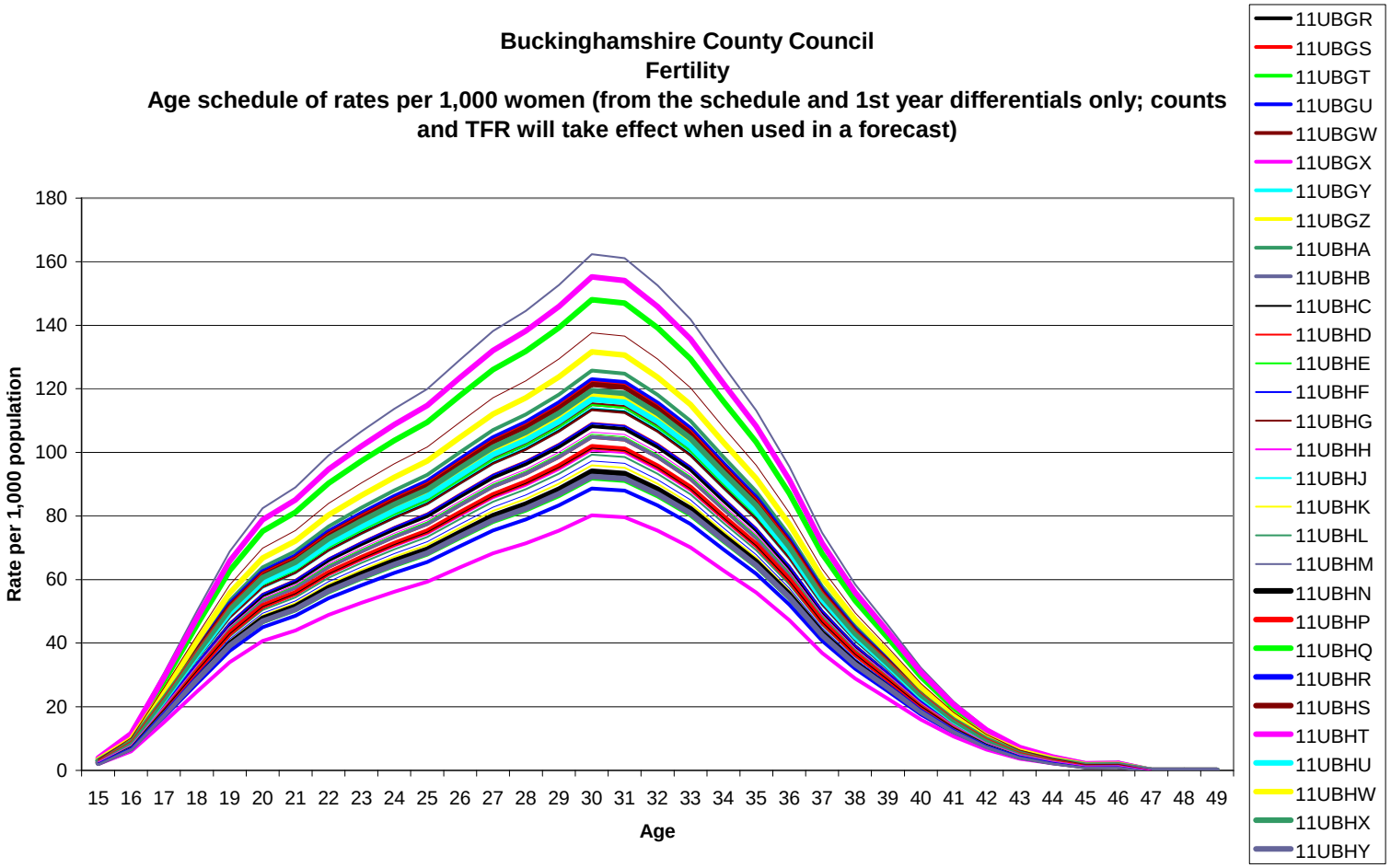
Data	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Total	0.90																		

Rates | Sched | Notes | AV | 11UBGR | 11UBGS | 11UBGT | 11UBGU | 11UBGW | 11UBGX | 11UBGY | 11UBGZ | 11UBHA | 11UBHB | 11

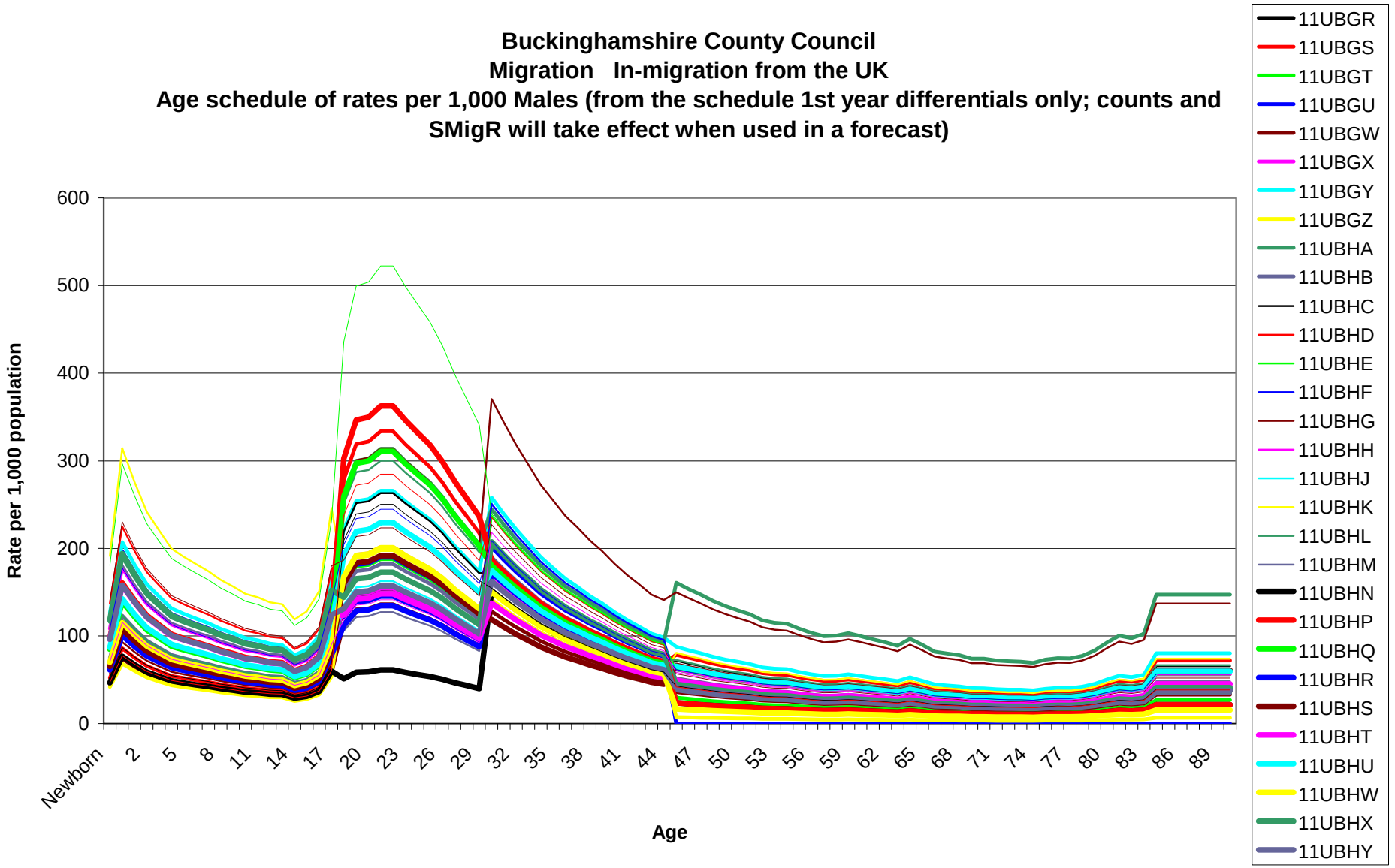
Estimated TFR each past year, average used for a forecast



Local fertility age schedules differ only in level



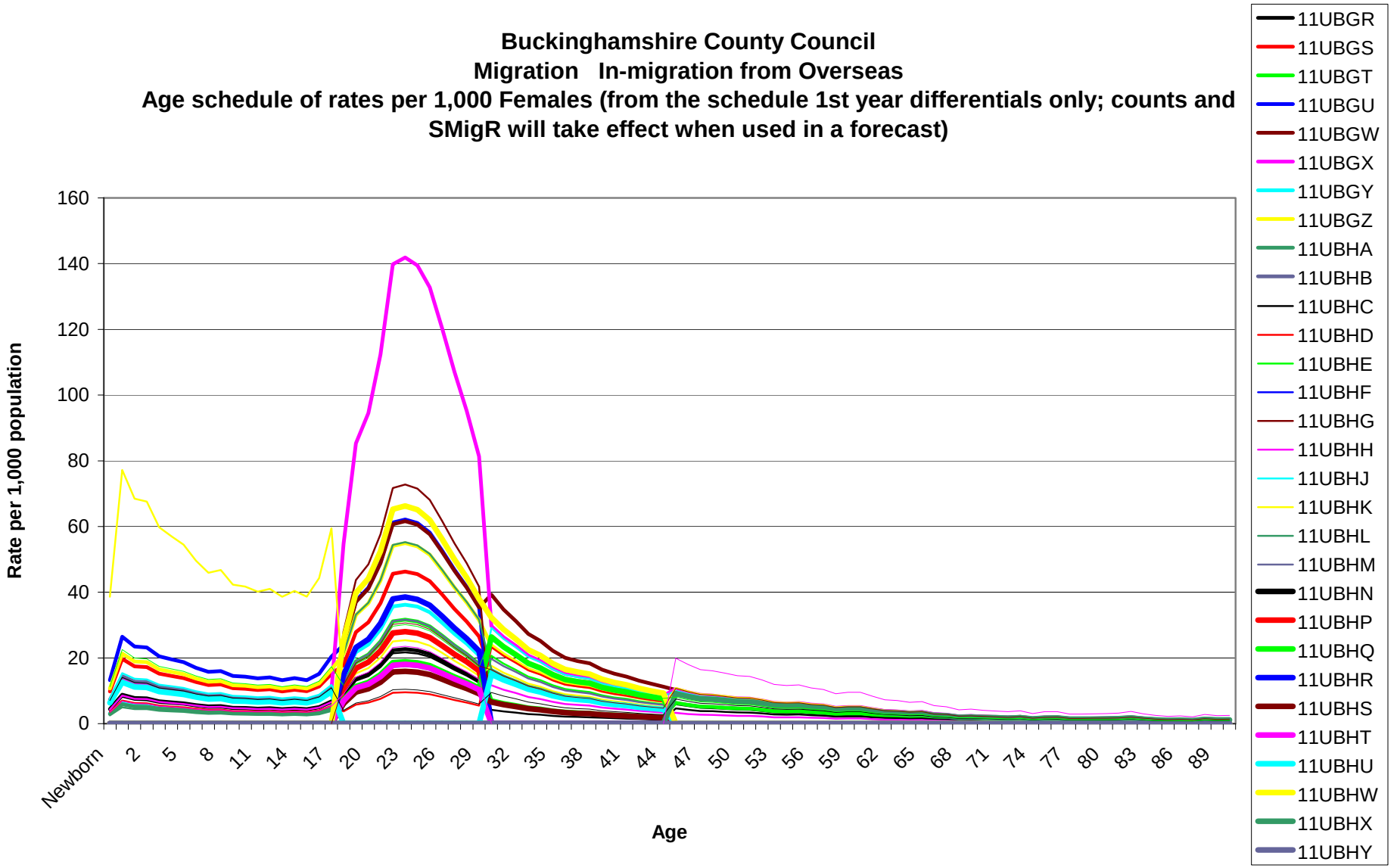
Migration from census: national age schedule with local differentials for 4 age bands



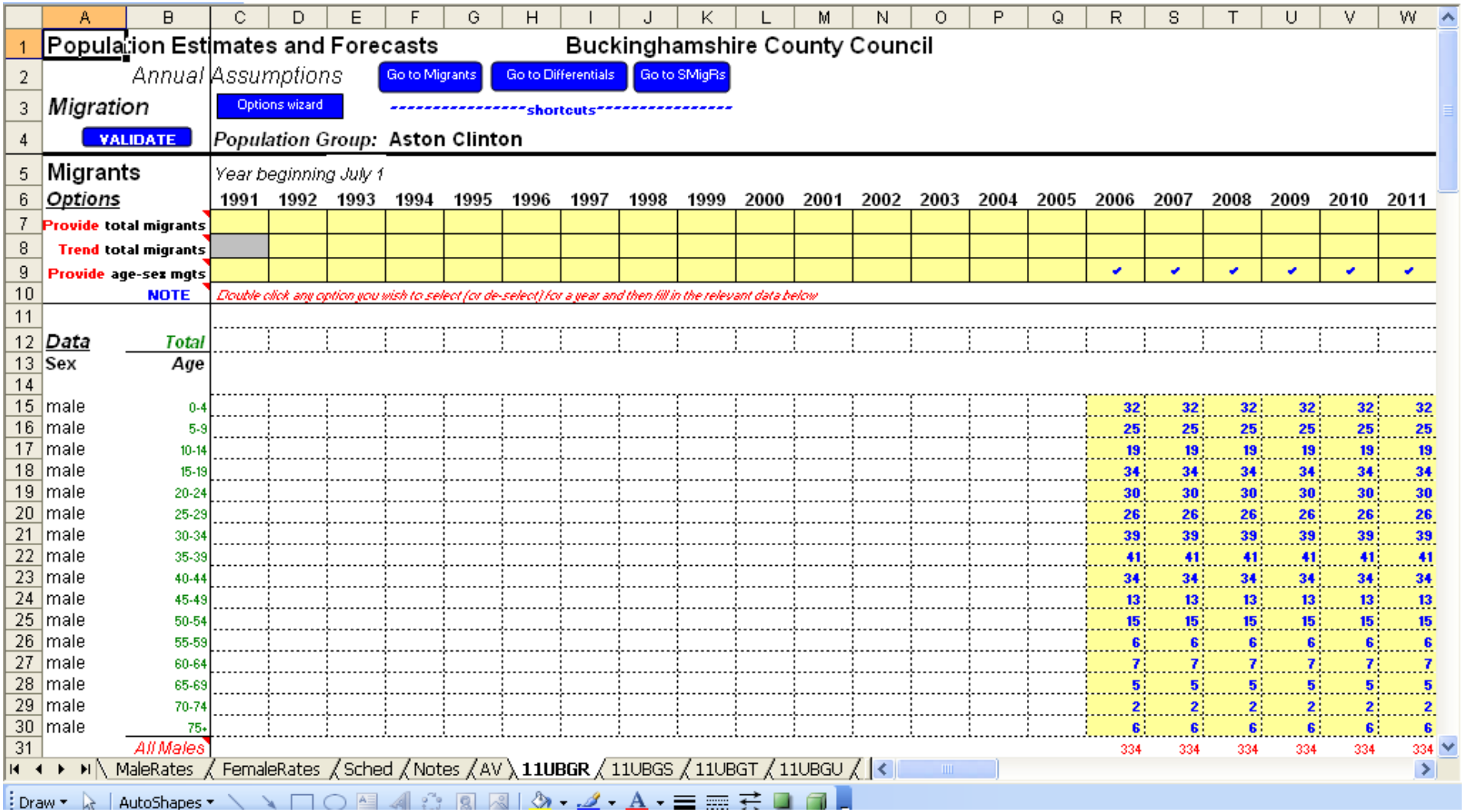
Immigration

Extreme: Luffield Abbey school (institutional population)

Buckinghamshire County Council
Migration In-migration from Overseas
Age schedule of rates per 1,000 Females (from the schedule 1st year differentials only; counts and SMigR will take effect when used in a forecast)



Future migrants set to recent counts estimated from population change since 2001



Population Estimates and Forecasts — Buckinghamshire County Council

Annual Assumptions — Go to Migrants | Go to Differentials | Go to SMigRs

Migration — Options wizard — shortcuts

VALIDATE — Population Group: Aston Clinton

Migrants — Year beginning July 1

Options

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Provide total migrants																					
Trend total migrants																					
Provide age-sex mgts																✔	✔	✔	✔	✔	✔

NOTE: *Double click any option you wish to select (or de-select) for a year and then fill in the relevant data below*

Data	Total																				
Sex	Age																				
male	0-4															32	32	32	32	32	32
male	5-9															25	25	25	25	25	25
male	10-14															19	19	19	19	19	19
male	15-19															34	34	34	34	34	34
male	20-24															30	30	30	30	30	30
male	25-29															26	26	26	26	26	26
male	30-34															39	39	39	39	39	39
male	35-39															41	41	41	41	41	41
male	40-44															34	34	34	34	34	34
male	45-49															13	13	13	13	13	13
male	50-54															15	15	15	15	15	15
male	55-59															6	6	6	6	6	6
male	60-64															7	7	7	7	7	7
male	65-69															5	5	5	5	5	5
male	70-74															2	2	2	2	2	2
male	75+															6	6	6	6	6	6
	All Males															334	334	334	334	334	334

MaleRates | FemaleRates | Sched | Notes | AV | 11UBGR | 11UBGS | 11UBGT | 11UBGU

Draw | AutoShapes

icrosoft Excel - Mig_INUK2.xls
File Edit View Insert Format Tools Data FlashPaper Window Help Adobe PDF
Type a question for help
140% Arial 10
Reply with Changes... End Review...
A1 Documentation for the set of Migration parameters contained in this workbook

A

Documentation for the set of Migration parameters contained in this workbook

The standard rate takes the shape of national migration rates, scaled to District 2001 census experience within each age group 0-17, 18-29, 30-44, 45+.

The standard rate is not used except in outputs to calculate SMigR.

The forecast uses the schedule of group rates which are further scaled to the migration for the 2001 census wards most closely associated with the small area.

Source of standard schedule of rates:

Last Updated:
24-Jun-08

MaleRates FemaleRates Sched Notes AV 11UBGR 11UBGS 11UBGT 11UBGU
AutoShapes
NUM

Routines to automate technical tasks (once GRO(S) provide data)

- Geographical conversion
  - Datazones to suitable areas
  - Convert counts: base and later population estimates, births, deaths, (migrants?)
  - List: datazone, smallarea, allocation =1 or less
  - Choose or convert a suitable age-sex schedule for each of fertility, mortality, 2 or 4 migration flows
    - Requires discussion about suitable data
    - Fertility and mortality: National, district, local age-specific pattern of rates? CCSR has used national pattern with local level.
    - Migration: average over several years for each datazone?
    - Migration: immigration and internal migration?
    - Migration: CCSR has used closest census ward, adjusted by age-specific population change since census: past migration counts not needed.

Routines to automate technical tasks (1)

- Set up model and a training projection
  - Set up model
  - Populate input files with schedules, counts and constraints from 2001 to the latest population estimate.
  - Run 1: Projection from 2001 to latest population estimate (the training phase).

Routines to automate technical tasks (2)

- Calibrate for local differentials
  - Use output from Run1 to
    - Estimate local differentials for fertility, mortality and migration that will be used for future
    - Alternatively, estimate local age-sex profile of migrant counts, for future migration flows
  - Input data for constraint to Council Area projection
  - Run 2 and 3: Projections to final year with and without constraint
  - Run 4: Validation: comparison of population estimates with projection without a constraint for those years
  - Runs 5+: sensitivity testing with alternative assumptions

Routines to automate technical tasks (3)

- Reports
  - Standard reports
  - Comparisons between forecasts
    - sensitivity to different assumptions
    - Housing-led scenarios

Routines to automate technical tasks (4)

- Housing-led projections
  - Age-specific headship rates
    - Council Area (GRO(S)), scaled to small area number and types of household (census)
  - Numbers not in households (census or better)
  - Planned housing (Council)
  - Conversion between dwellings and households
    - Sharing, vacancy, second homes (census or better)

In-house or external?

- Assume that GRO(S) provide suitable data
- ‘Routines’: Cutting and pasting; external formulae; macros; VBA routines; judgements
- In-house:
  - control; existing resources; flexibility; best local practice; improve understanding;
- External:
  - Efficiency, independence, best agreed practice

Combined in-house and external: less hassle, maintain control

- GRO(S) provides public service
- Council researchers press for POPGROUP routines
  - Decision of PG steering group; potential cost is shared
  - Council retains data management, preparation and all judgements.
- CCSR provide fee-paying service
  - In England, £3,725+VAT for projections for small areas within one Council area; Household extra
  - CCSR get data for all DataZones and Council Areas from GRO(S)
  - Council gets raw data, plus POPGROUP input and output files
  - Allows Council to develop with their own assumptions, if staff are conversant with POPGROUP and forecasting