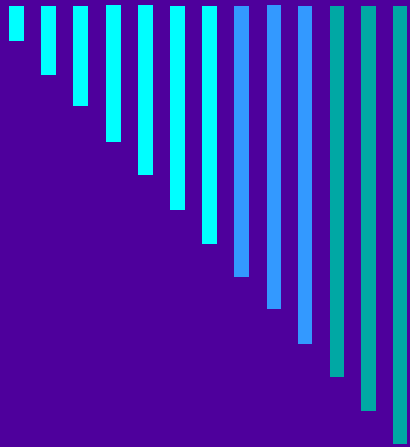

Counting people: past, present, future – reflections at the start of the 21st Century



Philip Rees (University of Leeds)

Thursday, 12 May 2005 at 5:00 p.m.

Oskar Lange Hall of the Faculty of Economic Sciences,
Warsaw University

(ul. Długa 44/50, 4th floor).



Context

- I want to look back at a review of spatial demography I did a dozen years ago and reflect on developments since 1993. What has changed between 1991 and 2001? What additional insights have been achieved?
 - Original papers:
 - Rees, P. (1993-94) Counting people: past, present and future. *University of Leeds Review*, 36, 247-273 (short version) and Working Paper 93/3, School of Geography, University of Leeds (online PDF in pipeline – long version).
-



Outline: selected topics covered in 1993 paper

- 1. Population censuses
 - 2. Population accounting
 - 3. Population projection
 - 4. Mortality and morbidity trends
 - 5. Migration trends
 - 6. Evolution of the elderly
-



1. Population censuses

- ❑ Vital for knowledge of national and local populations (especially if country lacks population register)
 - ❑ 1991 Census in UK: problems of under-enumeration (2.2%)
 - ❑ 2001 Census In UK: measures planned to combat under-enumeration: One Number Census project inc. Census Coverage Survey and data capture/recapture method
-



Derivation of the “Dual System Estimator”

	Survey	Survey	Totals
Census	Counted S	Not counted s	
Counted C	$N(C,S)$	$N(C,s)$	$N(C)$
Not counted c	$N(c,S)$	$N(c,s)$	$N(c)$
Totals	$N(S)$	$N(s)$	$N(T)$



Problems in counting people

- ❑ Now-cast of 2001 population (June 30) was 59.9 millions
 - ❑ 2001 Census (April 29) was 58.8 millions
 - ❑ Shortfall of 1.1 millions, mainly men aged 25-44
 - ❑ Gone to OZ, Ibiza, Iraq?
 - ❑ Revisions of estimate based on census to 59.1 millions
-



Census outputs: 1991 vs 2001

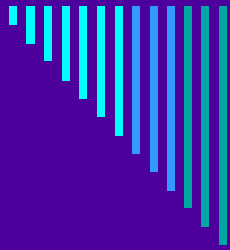
- Area statistics: roughly comparable but with common *output area* based on the unit postcode (e.g. LS16 7HR) for UK
 - Microdata: more datasets but less detail because of confidentiality concerns
 - Flow data: more detail for whole UK
 - Longitudinal data: 1971 to 2001 series
 - Map data: much better in 2001
-



ESRC/JISC 2001 Census of Population Programme: much better



- Data Support Units provide the major focus of the activities of the 2001 Census Programme:
 - The Census Dissemination Unit at MIMAS, University of Manchester supports the Census Area Statistics and postcode lookup tables
 - The UKBORDERS service at EDINA , University of Edinburgh , supports digital boundary datasets
 - The Census Interaction Data Service at the University of Leeds and University of St Andrews supports the migration and travel to work statistics
 - The Cathie Marsh Centre for Census and Survey Research at the University of Manchester supports the Samples of Anonymised Records
 - The Centre for Longitudinal Study Information and User Support at the London School of Hygiene and Tropical Medicine supports the Longitudinal Study Registration
 - All users wishing to use the area statistics, digital boundaries, interaction data or samples of anonymised records, should register via the Census Registration Unit , based in the UK Data Archive at the University of Essex
 - The overall programme coordinator is Professor David Martin at the University of Southampton
- <http://www.census.ac.uk>



National statistics dissemination: vastly better

- ONS (England and Wales):
<http://www.statistics.gov.uk/census2001/>
&
<http://www.nomisweb.co.uk/home/censuss2001.asp>
- GROS (Scotland): <http://www.gro-scotland.gov.uk/statistics/census/>
- NISRA (Northern Ireland):
<http://www.nisra.gov.uk/census/>



2. Population accounting

□ Components of change

- $P(t+1) = P(t) + B - D + M^{\text{in}} - M^{\text{out}} + I - E$

□ Multistate accounts

- Transition: state at start/entry in interval to state at end/exit in interval. One transition per person
 - Movement: move from one state to another in interval. Persons can make several moves.
 - Distinction still not widely understood!
-



Improvements in population accounts?

- ❑ Births and deaths pretty good, geocoding had improved
 - ❑ Internal migration now based on new method, which is much better (comparison of two successive registers using NHS number and address postcodes)
 - ❑ International migration still very problematic
 - ❑ Plans for national ID cards and plans for embarkation as well as disembarkation cards if the new Parliament approves
-

Population accounting: transitions

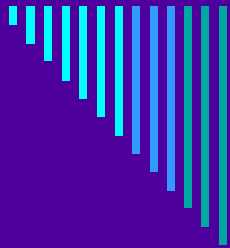
Start			Survive at end			Die before end		
State		Region 1	Region 2	Abroad	Region 1	Region 2	Abroad	Totals
Exist	Region 1	C	✓M	E	C	E	E	✓P
at	Region 2	✓M	C	E	E	C	E	✓P
Start	Abroad	✓M	✓M	E	E	E	0	E
	Region 1	C	e	E	C	E	E	✓B
Born	Region 2	E	C	E	E	C	E	✓B
	Abroad	E	E	0	E	E	0	E
	Totals	✓P	✓P	E	✓D	✓D	E	C

- ✓ = available from data
- E = estimate from other data
- C = compute from table
- P = population stocks
- D = deaths
- B = births
- M = migrant data from census or register (comparison of two points in time)
- 0 = not relevant (enter as zero)

Population accounting: movements

		State	after	Move		
		Region 1	Region 2	Abroad	Death	Totals
State	Region 1	C	✓M	✓E	✓D	✓P
before	Region 2	✓M	C	✓E	✓D	✓P
Move	Abroad	✓I	✓I	0	0	✓I
	Birth	✓B	✓B	0	0	✓B
	Totals	✓P	✓P	✓E	✓D	C

- ✓ = available from data
- E = emigration
- I = immigration
- C = compute from table
- P = population stocks
- D = deaths
- B = births
- M = migration data from register
- 0 = not relevant (enter as zero)



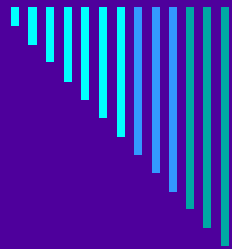
How to use population accounts

- ❑ To specify base period for projection
 - ❑ To align projections over historical period
 - ❑ Match projection model to type of accounts
 - ❑ Method for filling in accounts depends on data available
 - ❑ Generate from accounts transition probabilities for projection (directly from transition accounts; indirectly from movement accounts via occurrence-exposure rates)
-



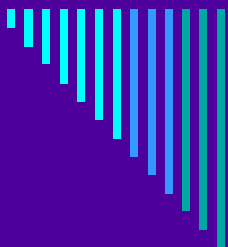
3. Population projection: thinking about assumptions

- ❑ Q: How has thinking about assumptions changed over the past dozen years?
 - ❑ Here I draw on discussion on the 5th May 2005 at the *National Population Projections Expert Advisory Group* meeting about assumptions for the next round of UK projections
 - ❑ Present: staff from GAD, ONS, HO (central government), GLA (Local Government) and Universities (LSE, UCL, Oxford, Leeds)
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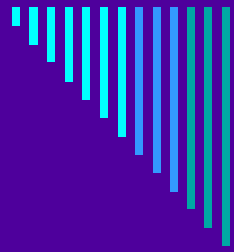
Population projection: thinking about fertility (1)

- General agreement that tracking cumulative cohort fertility was the right approach
 - There was an interesting upturn in period TFR in 2003-4 (1.65 to 1.75): need to investigate why
 - We focussed on completed family size in 2030 (the method would trend towards this and use constant rates beyond)
-



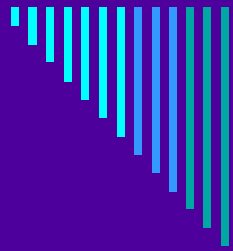
Population projection: thinking about fertility (2) – tempo running out and existing policies ineffective

- ❑ There is a tempo effect at work: postponement of fertility into thirties ages but this must run out of steam soon
 - ❑ The key decision was between no children and some children. Intentions show people want two children but “things” get in the way
 - ❑ Child and family friendly policies (so far tried) will only achieve +0.1 child increase at most
 - ❑ There may be a counter-effect from policies to reduce teenage fertility (UK highest in Europe)
-



Population projection: thinking about fertility (3) – effect of stronger policies

- However, there is recent evidence from France, Netherlands and Denmark of an upturn related to policies
- We might have stronger policies: for each child you get a discount on pension contributions
- Population is rising up the policy agenda because of the ageing-pensions-labour force links



Population projection: thinking about fertility (4) – composition shifts

- The shift in population composition towards ethnic minorities with higher fertility might mean a 0.1 to 0.2 child increase in CFS by 2030
 - But ethnic minority fertility for some groups has already fallen to or below the ethnic majority level
 - There will also be a shift towards higher fertility regions
-



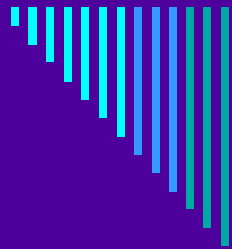
Population projection: thinking about fertility (4) – my guess

- CFS of 1.9 in 2030
 - Confidence interval: 10% 1.65
 - Confidence interval: 90% 2.15
 - But this could be because I have just become a grandfather!
-



Population projection: thinking about mortality (1) – past errors

- ❑ There was consensus among the academic experts that GAD/ONS had consistently underestimated the decline in age-specific mortality and therefore underestimated the growth in the older population
 - ❑ This had resulted in poor decisions about pension schemes (funding, contributions, age at retirement). The UK had failed to appreciate Marek Gora's warning that PAYG systems were "Ponzi" schemes (fraudulent pyramid selling)
-



Population projection: thinking about mortality (2) – don't stop the improvements

- ❑ GAD/ONS assume that rates of decrease in mortality by age-sex groups which currently vary between 0.5% and 5% (average about 2%) will converge on 1% by 2030 and remain constant thereafter
- ❑ The academic experts felt this still risked repeating the errors of the past and would under-estimate improvements
- ❑ Experts said stick with average rates of decrease observed over the past two decades of around 2%



Population projection: thinking about mortality (3) – let's live longer

- Our reasons for this view:
 - UK has “vast room” to catch up with the best (Japan, Iceland, France, Italy)
 - UK has “vast scope” to introduce better programmes of prevention and treatment already proved elsewhere
 - UK has “vast room” to raise health care for the poorest sections of society to the care experienced by the richest
 - There are a large number of programmes and research seeking to improve treatments
-



Population projection: thinking about mortality (4) - caveats

- This optimistic view assumes:
 - Continued economic growth
 - Life style epidemics (obesity related mortality, alcohol abuse mortality) can be prevented
 - Current infectious epidemics (e.g. HIV/AIDS, Hepatitis C, MRSA) can be contained/solved
 - The killer infections don't get loose (e.g. Avian flu, SARS, Ebola, Marburg)
 - Past favourable trends don't run out of steam (e.g. the effect of reduction in smoking behaviour on lung etc cancer and cardiovascular disease)
 - So the UK needs studies of trends in the causes of death to inform its future assumptions
-



Population projection: thinking about migration (1) - Background

- The projection model uses net international migration. The UK has switched from being a net emigration country to being a country in balance or experiencing net immigration only since the 1970s with the 1990s seeing high immigration.
 - The experts differed in their attitudes to immigration from very positive (me) to rather negative (a colleague). We had a lively debate as did the county in the weeks leading up to the General Election of 5 May. Both Labour and Conservative Parties were in favour of fair policies on immigration with firm controls.
 - One expert argued that the UK would soon have to adopt a points based and quota system tied to labour market demands as practised by Canada, USA and Australia. Already Scotland has been given permission to encourage high skill immigration (and to suspend UK regulations).
-



Population projection: thinking about migration (2) - numbers

- The 2002 based UK projections assumed a long term level of +130k pa
 - There is evidence of higher trends since then so the assumption is likely to rise
 - The experts were shy in putting forward figures for 2030
 - Except me, who said +250k pa! With confidence interval +150k (10%) to +350k (90%)
-



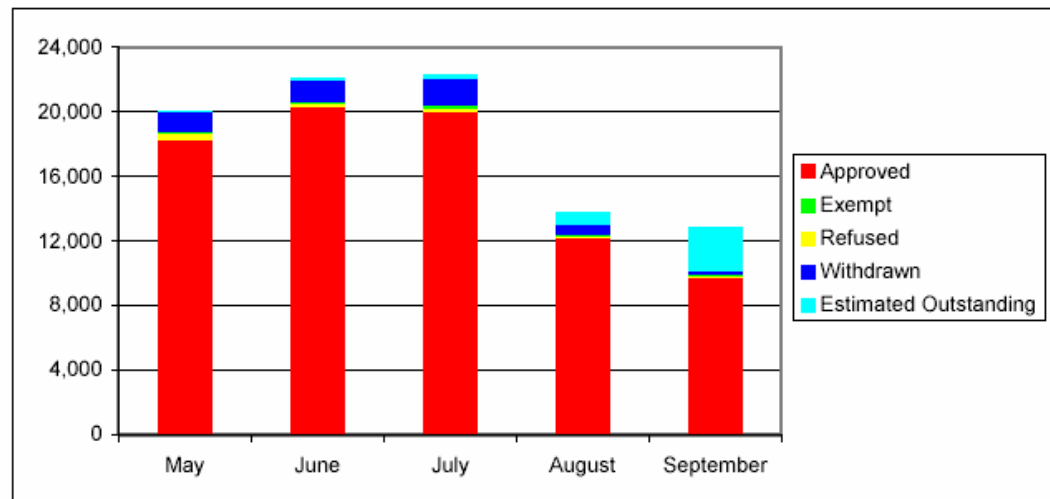
Population projection: thinking about migration (3) - reasons

- ❑ The 2010 to 2040 period will see the retirement of the baby boom cohorts (1945 to 1970) and a huge increase in the older UK population
 - ❑ There will be increased health and care demands and a shrinking labour force
 - ❑ Some labour demand can be met by shifting retirement age later and recruiting the young elderly to the health and care sector
 - ❑ But there will be a huge demand for such labour from outside the UK
-

Population projection: thinking about migration (4) – new flows

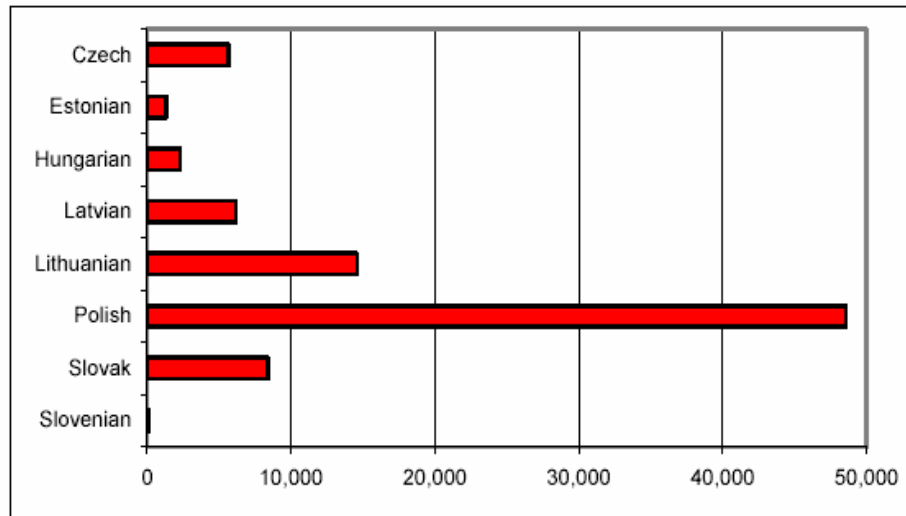
- We discussed the migration from the A8 countries (now free to send migrants)
- The Government has published a report on the numbers registering for work
- Home Office, Department for Work and Pensions, Inland Revenue and Office of the Deputy Prime Minister (2004) *Accession Monitoring Report, May-September 2004*. Accessed from: <http://www.homeoffice.gov.uk/rds/hosb1104.pdf>.

Chart 1: Applicants applied by month applied. May – September.



Population projection: thinking about migration (5) – A8 origins

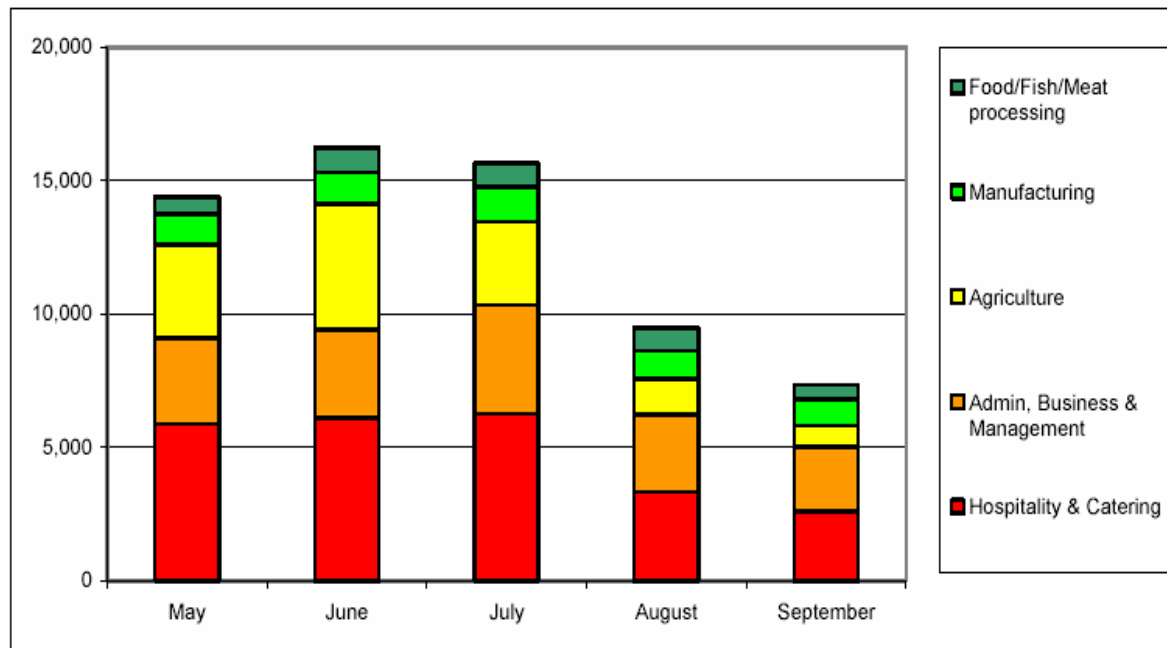
Chart 2: Nationality of applicants by month applied. May – September.



- In the period 1 May to 30 September, the highest proportion of applicants were Polish (56% of the total), followed by Lithuanian (17%) and Slovak (10%) applicants.

Population projection: thinking about migration (5) – A8 sectors

Chart 5: Top 5 sectors in which registered workers are employed, by month applied. May – September.





Population projection: thinking about migration (5) – students & families

- ❑ We recognised the importance of student immigration to the UK
 - ❑ Universities compete hard to recruit from overseas to raise income (particularly from outside the EU because EU students pay UK fees)
 - ❑ Measures to retain skilled graduates
 - Scotland issues 2 year work permits for any graduate (no questions asked)
 - Work permit applications can be approved by return of post!
 - ❑ We also recognised the continuing importance of overseas marriages for British Asians
-



4. Mortality and morbidity trends (1): HIV/AIDS

- In 1993 I reviewed the results of the demographic-epidemiological model that Julia Williams and I had built of the HIV/AIDS epidemic in the regions of the UK (see Williams J and Rees P 1994 "A simulation of the transmission of HIV and AIDS in United Kingdom regional populations". *Transactions of the Institute of British Geographers*, NS 19, 311-330). *Transactions of the Institute of British Geographers*, NS 19, 311-330). Were the forecasts accurate for 1990-2000?
 - Yes, a quick comparison with the published statistics up to 2000 indicated we were quite accurate (though a careful check is needed).
 - Since 2000 there have been some rises in HIV infections through heterosexual transmission. These are a result of sexual activity by UK young holiday makers visiting Mediterranean resorts and of the immigration of HIV infected persons from Africa. The lesson: a need to connect a national model to other countries, which more recent work by Richard Thomas and others has done.
 - What we did not predict was the development of successful multi-anti-retroviral drug therapy which has prevented or slowed the transition from AIDS to death. We did suggest that our results could help in targetting an immunisation campaign, should a vaccine be developed. Sadly, efforts to date to develop a vaccine have failed.
-



4. Mortality and morbidity trends (2): Illness inequalities

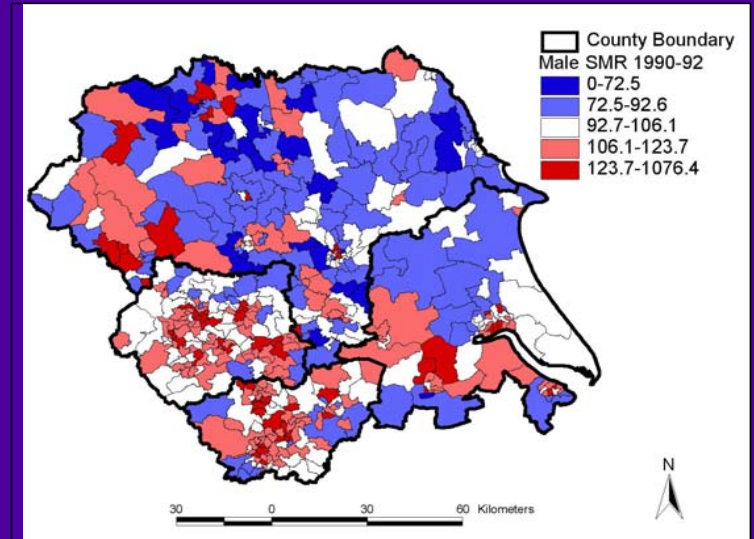
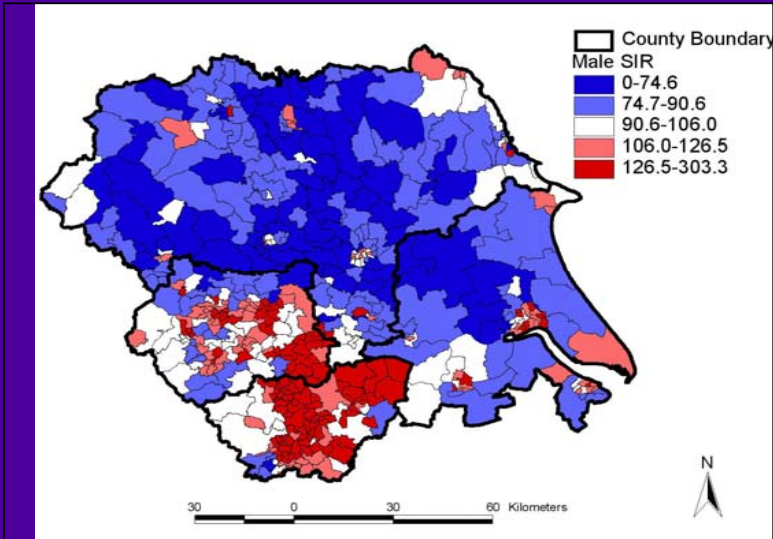
- In 1993 I examined the relationship between crude illness and death rates for counties in Great Britain. The correlation was only 0.5 and there were systematic deviations: Welsh counties had more illness than death rates suggested.
 - The work was criticised: it did not use age-sex standardisation; the areas were large; there was no control for underlying socio-economic determinants.
 - Senior (1998) carried out a ward level analysis using SIRs and constructed a multivariate explanatory model using census deprivation indicators and dummy indicators . The Welsh wards still had more illness than his model predicted.
 - Senior M. (1998) Area variations in self-perceived limiting long-term illness in Britain. Is the Welsh experience exceptional? *Regional Studies*, **32**, 265-280.
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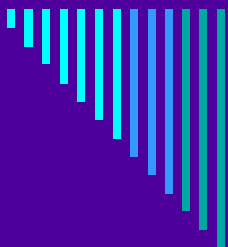


4. Mortality and morbidity trends (3): Changes 1991-2001

- ❑ What happened in the ten years? Self-reported morbidity increased from 13% to 20% at the same time as life expectancies had risen by about 2 years.
 - ❑ Why? Perhaps as a consequence of rising expectations and greater awareness of what long term illness is.
 - ❑ Note that illness measures are more closely related to deprivation at small area scale than mortality measures.
 - ❑ Compare the clear map of illness with the more variable map of mortality.
-

4. Mortality and morbidity trends (4): Standardised Illness and Mortality rates in Yorkshire & the Humber 1991 & 1990-92



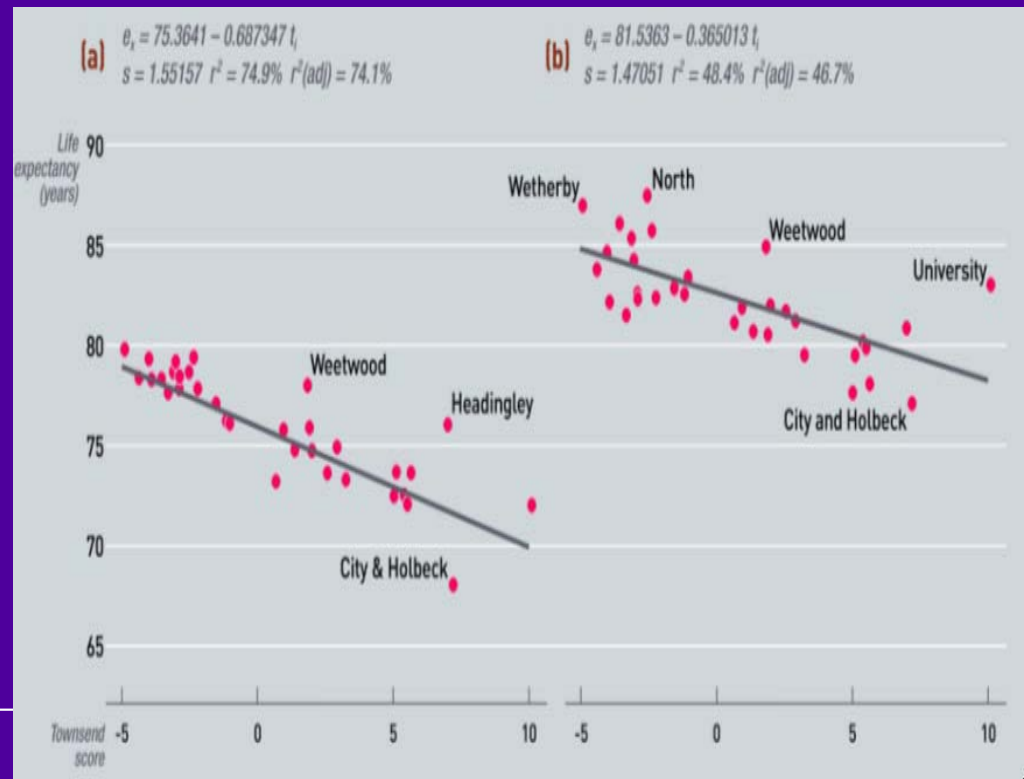


4. Mortality and morbidity trends (5): Ward inequality indices for illness and death, selected years (Brown and Rees 2005), which show decreasing inequality for illness and increasing inequality for mortality (men)

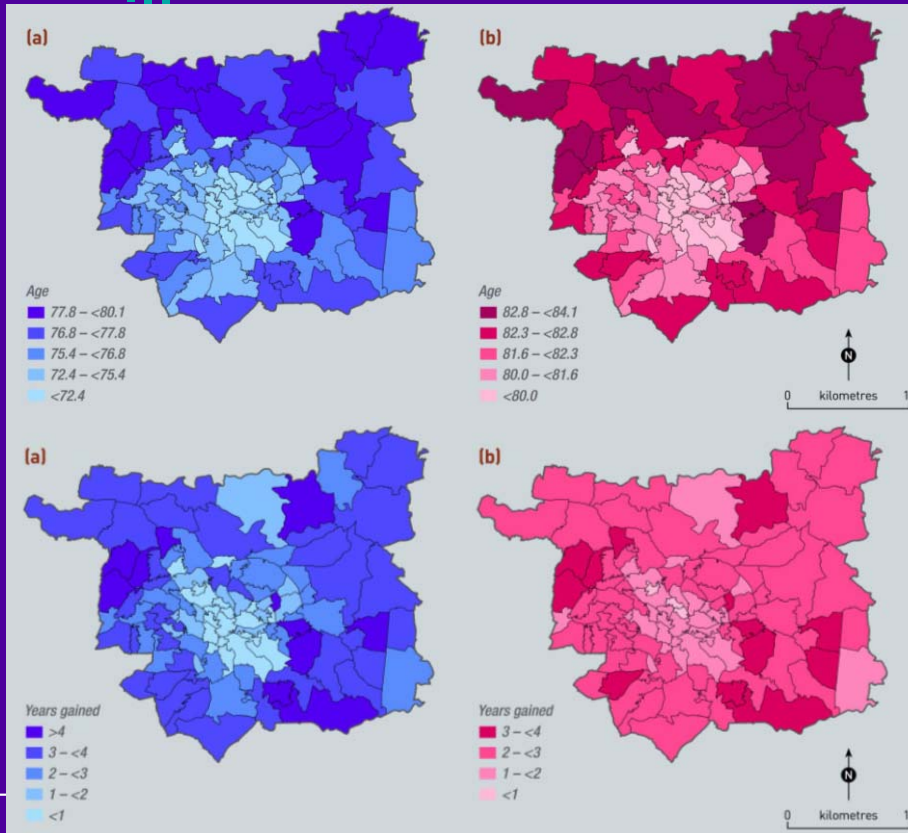
Illness	Illness 1991		Illness 2001		Change	
	Male	Female	Male	Female	Male	Female
All ages	9.84	8.49	9.77	8.33	-0.07	-0.16
Mortality	Mortality 1990-92		Mortality 1996-98		Change	
	Male	Female	Male	Female	Male	Female
All ages	7.68	10.23	8.18	10.24	0.50	0.01

4. Mortality and morbidity trends (6): estimation of life expectancies for community areas in Leeds (source: Chapter 2, pp.26-48 in Unsworth, R. and Stillwell, J. (eds) *Twenty-First Century Leeds: Geographies of a Regional City*. Leeds University Press, Leeds.

- Method: regress life expectancy against Townsend deprivation score for 33 wards
- Use equation with Townsend scores for 106 community areas (CAs) to predict life expectancies for community areas
- Adjust the predictions so the weighted sum of CA life expectancies is equal to the ward estimate for life expectancy
- Allows CA life expectancies to vary around their ward means
- Assumes relationship at ward scale holds at CA scale



Neighbourhood life expectancies, 2000-02 and change 1990-92 to 2000-02

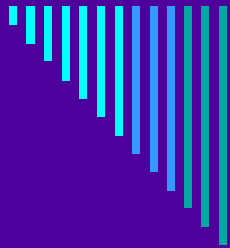


□ (a) = men, (b) = women

□ Poverty and inner city living seriously affect your health

□ Poorer communities are gaining less than richer

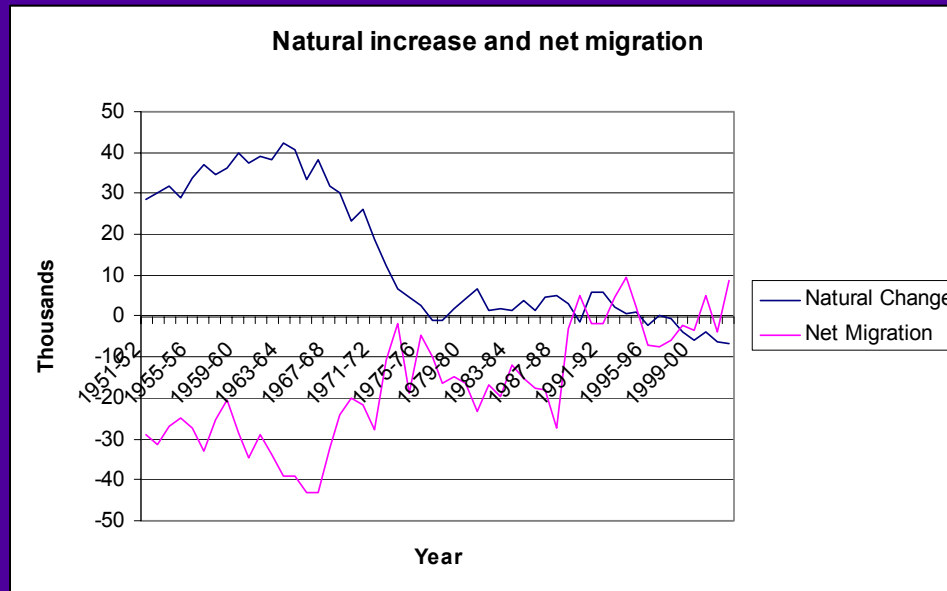
□ Inequality is greater for men than women and it is increasing more for men



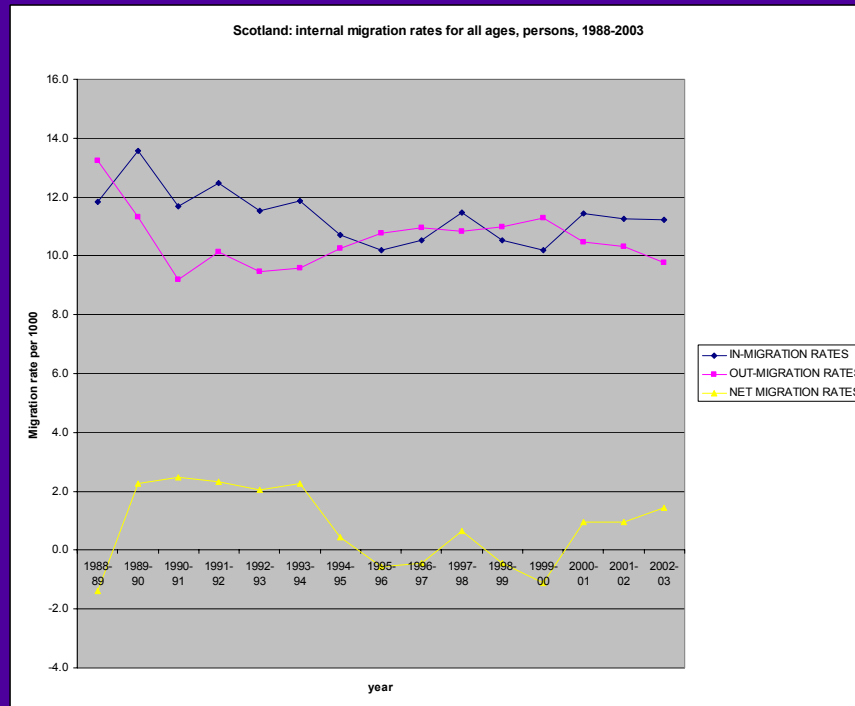
5. Migration trends (1): since 1993

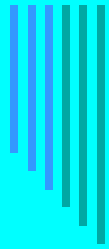
Trends in early 1990s see Rees, Durham and Kupiszewski 1996, WP96-20, http://www.geog.leeds.ac.uk/wpapers/96-20.pdf	Trends since early 1993 See Champion, T. <u>The census and the cities</u> . <i>Town & Country Planning</i> 2004, 73 (1), 20-22. See Dorling, D & Thomas, B (2004) <i>People and places : a 2001 census atlas of the UK</i> Bristol : Policy Press.
Migration volume is sensitive to the economic cycle and linked to the mortgage interest rate in the housing market. Early 1990s: end of boom, recession starting in property and London	Migration was higher in 2001 Census (circa 12%) compared with 1991 Census (9%) because of cycle differences. Cycles have been less important since 1994 (so far).
Drift from North & West to South & East. Long standing. But subdued by late 1980s boom and early 1990s bust	Drift to Greater South East, East and South West still important. Northern England regarded as a "basket case" by Dorling and Thomas and by Government (plan to demolish 100k+ old houses)
Deconcentration from city centres, big cities to suburbs, commuter belt of towns & villages	Urban deconcentration continues but on lower scale
Complex linkages between all of the above processes	Complex linkages illustrated by the relationship between migration to and from Scotland and trends in SE England

5. Migration trends (2): Scotland's changing demographic regime



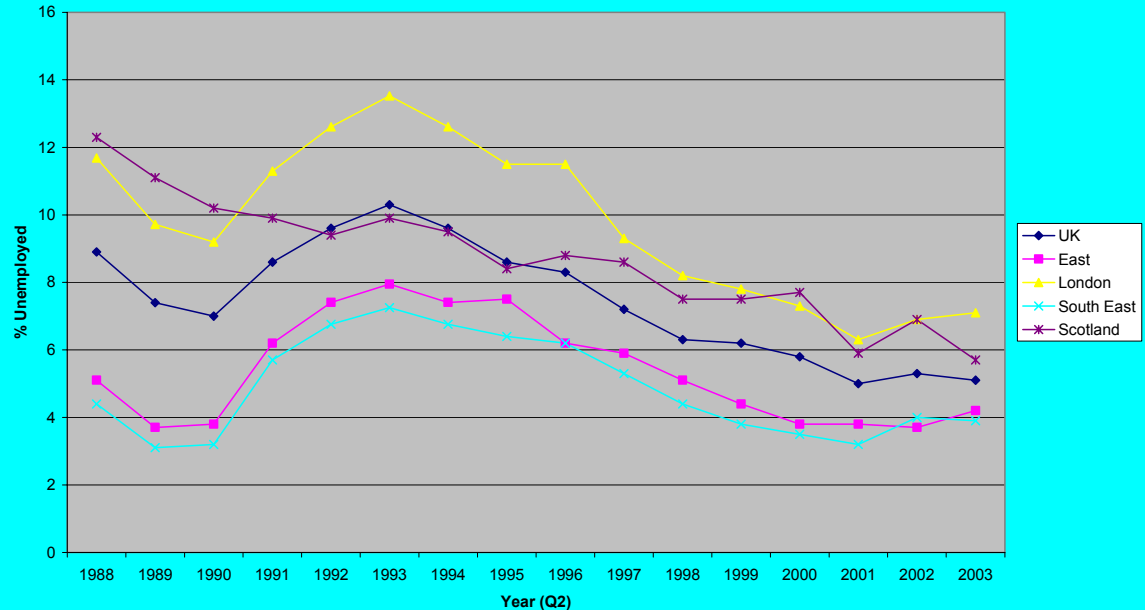
5. Migration trends (3): Scotland's migration flows 1988-2003





5. Migration trends (4): Unemployment rates in Scotland and the Greater South East

Unemployment Rates for UK and Regions





5. Evolution of the elderly

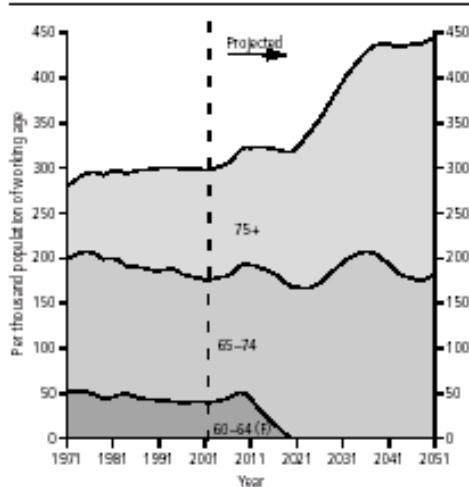
- ❑ GAD/ONS have revised upward our view on how much ageing there will be (but will need to revise their view upward).
 - ❑ By 2031, the population aged 60+ will make up 30% of the total compared with 21% now.
 - ❑ The 60-74 age group will grow by 49%; the 75+ age group will grow by 72%.
-

6. Evolution of the elderly: 2002-based UK projections
 (ONS/GAD 2004 National Population Projections London:
 TSO and <http://www.gad.gov.uk>)

Figure 3.7

Actual and projected components of elderly
 dependency ratio, 1971–2051

United Kingdom



Age group	2002	2016	2031
60-74	7853 13.3% 100	9909 15.9% 126	11728 18.1% 149
75+	4465 7.5% 100	5371 8.6% 120	7701 11.9% 172
All ages	59229 100% 100	62134 100% 105	64835 100% 109



6. Evolution of the elderly: consequences for pensions

- A Pension Commission has reported on the future of pensions in the UK
 - Their first report set out choices:
 - Extend working life (e.g. to 70 and beyond)
 - Increase contributions to state (unfunded) and private schemes (funded)
 - Compulsory savings for all
 - Accept increasing poverty
 - The Pension Commission will make recommendations in the autumn of 2005, which will probably include all of the above
-



7. Concluding remarks (1)

- ❑ **Population censuses:** better methods, worse results (undercount), better outputs, much better dissemination
 - ❑ **Population accounting:** better internal migration data (Register and Census), still need to understand frameworks for different models (e.g. infant migrants)
 - ❑ **Population projection:** better thinking about assumptions, v. good dissemination, need to be more optimistic about mortality improvement
-



7. Concluding remarks (2)

- **Mortality and morbidity trends:** need to help people at bottom improve their health, illness benefits data used rather than illness rates in deprivation index
 - **Migration trends:** stable in general, important changes at the margins (city centres, Scotland)
 - **Elderly evolution/ageing:** policy makers are having to face up to the demographic future
-