

2001 CENSUS INTERACTION DATA: RETROSPECT AND PROSPECT

Tony Champion

Centre for Urban and Regional Development Studies,
University of Newcastle

Oliver Duke-Williams and John Stillwell

School of Geography and Census Interaction Data Service,
University of Leeds

Presentation at 2001 Census Debriefing Seminar,
City Hall, London, 10 April, 2006

Presentation

- Introduction:
 - 2001 Census interaction data
 - Developments from 1991 interaction data
- 2001 Census interaction data issues:
 - Adjustment for disclosure control: impacts of small cell adjustment
 - Problems of comparison between censuses: definitional, statistical, geographical
- Conclusions:
 - Recommendations for 2011 outputs
 - Recommendations for 2011 questions

Introduction:

2001 Census interaction data

- Migration and commuting flow data involving two geographies: origins and destinations
- Extremely rich data sets for use by researchers and practitioners
- Especially valuable because of lack of alternative data sources, especially below district scale
- Territorially comprehensive and reasonably reliable
- Tell us many things about mobility patterns, place connectivity and behavioural processes

Introduction:

Developments from 1991 interaction data

- Coverage of whole UK (for most ODS)
- 100% data for all ODS including SWS
- Data on journey to place of study in Scotland (STS)
- Migration to, at and from university
- Richer data: more tables and detail within tables
- Additional sets of tables at Output Area level
- Imputation of missing data on workplace and migrants' origins (if not stated and not 'no usual address 1 yr ago')
- New concept of Moving Groups in SMS
- Different approach to disclosure control

In comparison with 1991 Census, there are a similar number of tables but: (1) considerably more counts in 2001, (2) all the counts are 100% in 2001, (3) OA level

Data sets	Level 1 (District)	Level 2 (Ward)	Level 3 (OA)
2001 SMS	10 tables, 996 counts	5 tables, 96 counts	1 table, 12 counts
1991 SMS	11 tables, 94 counts	2 tables, 12 counts	-
2001 SWS	7 tables, 936 counts	6 tables, 354 counts	1 table, 36 counts
1991 SWS*	-	Set C: 9 tables, 274 counts	-
2001 STS	7 tables, 1,176 counts	6 tables, 478 counts	1 table, 50 counts

* 10% sample

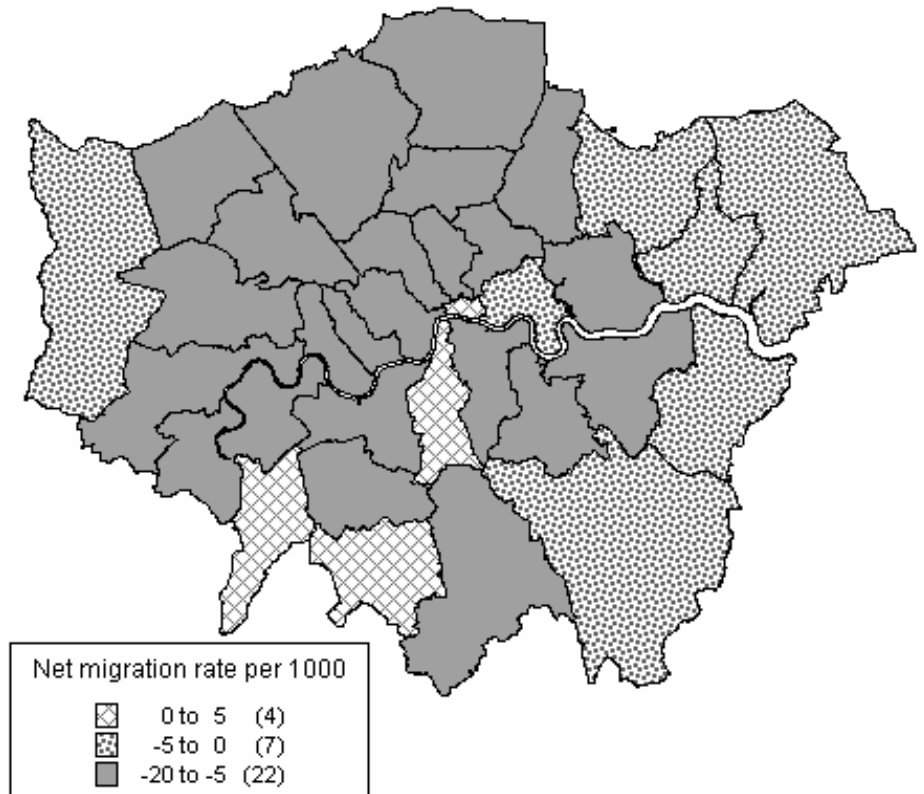
e.g. Tables and counts from
2001 SMS Level 1 and 1991 SMS Set 2 (Districts)

Variables	2001 Level 1		1991 Set 2	
	Tables	Counts	Tables	Counts
Age	Table MG101	75	Tables 1, 2	48
Family status	Table MG102	54	-	-
Ethnicity	Table MG103 and MG103N	33	Table 5	4
Limiting illness	Table MG104	84	Table 6	4
Economic activity	Tables MG105 and MG108	378	Table 7, 9, 10	21
Moving groups	Table MG106	16	Table 2	2
Tenure	Table MG107	32	Table 8 and 8S	7
Occupation	Table MG109	288	-	-
Some knowledge of Gaelic/Welsh/Irish	Table MG110	36	Table 11S and 11W	2
Marital status	-	-	Table 4	6

Example: Patterns of net migration for London boroughs



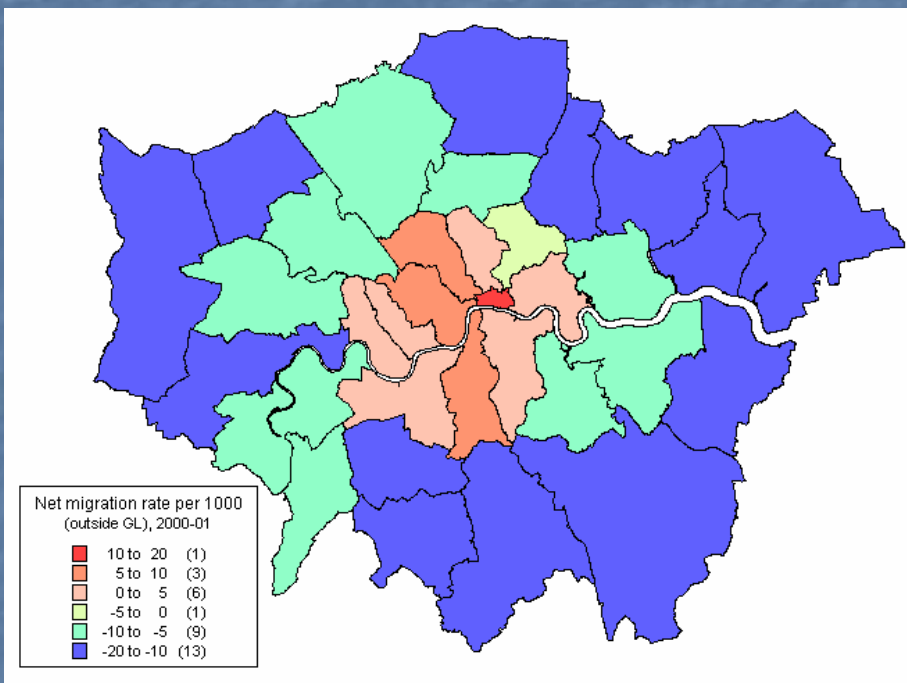
Aggregate rates of net migration show losses from all but three boroughs (& City of London)



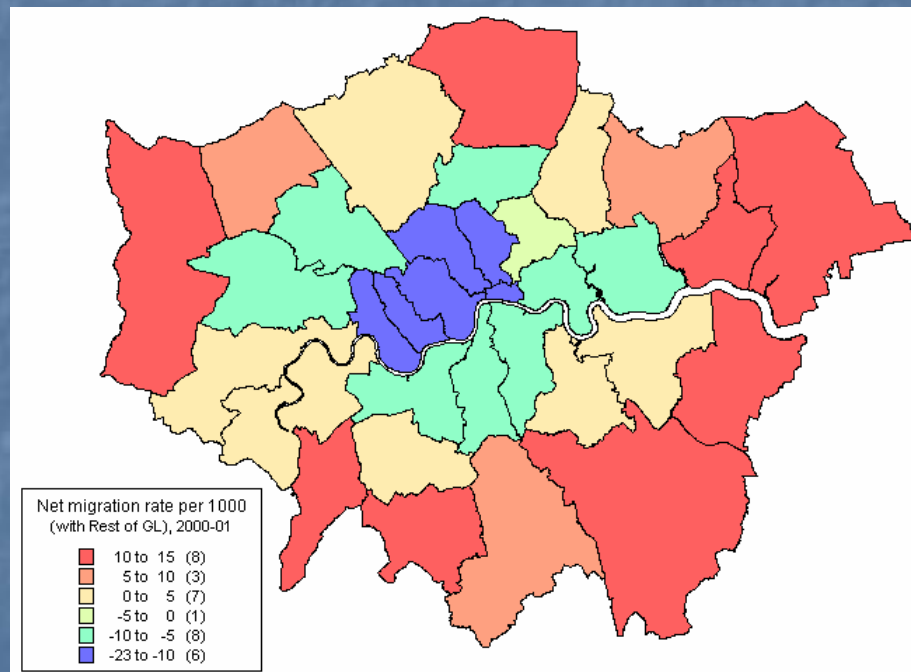
Source: 2001 Census SMS level 1

Example: SMS allow spatial disaggregation of net migration rates and expose different processes occurring

Net rates of migration for boroughs **within London** (inner boroughs losing, outer boroughs gaining)



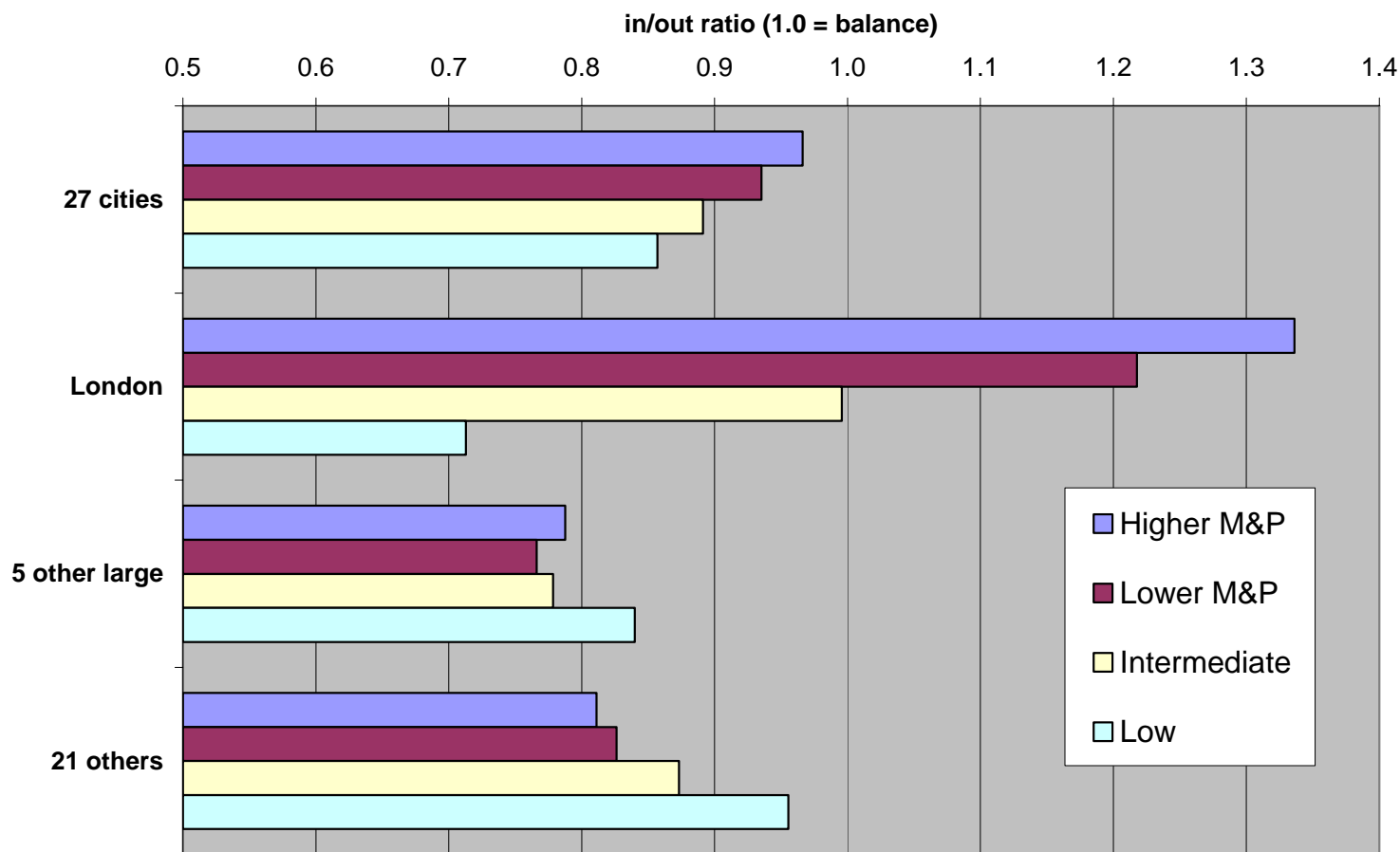
Net rates of migration for boroughs with the **rest of GB** (inner boroughs gaining, outer boroughs losing)



Source: 2001 Census SMS level 1

Example: in/out ratio for occupationally classified Moving Group Representative Persons, by broad NS-SeC, for 27 Cities (PUAs)

In/out ratio for classified MGRPs, by broad occupational type, for the 27 Cities grouped

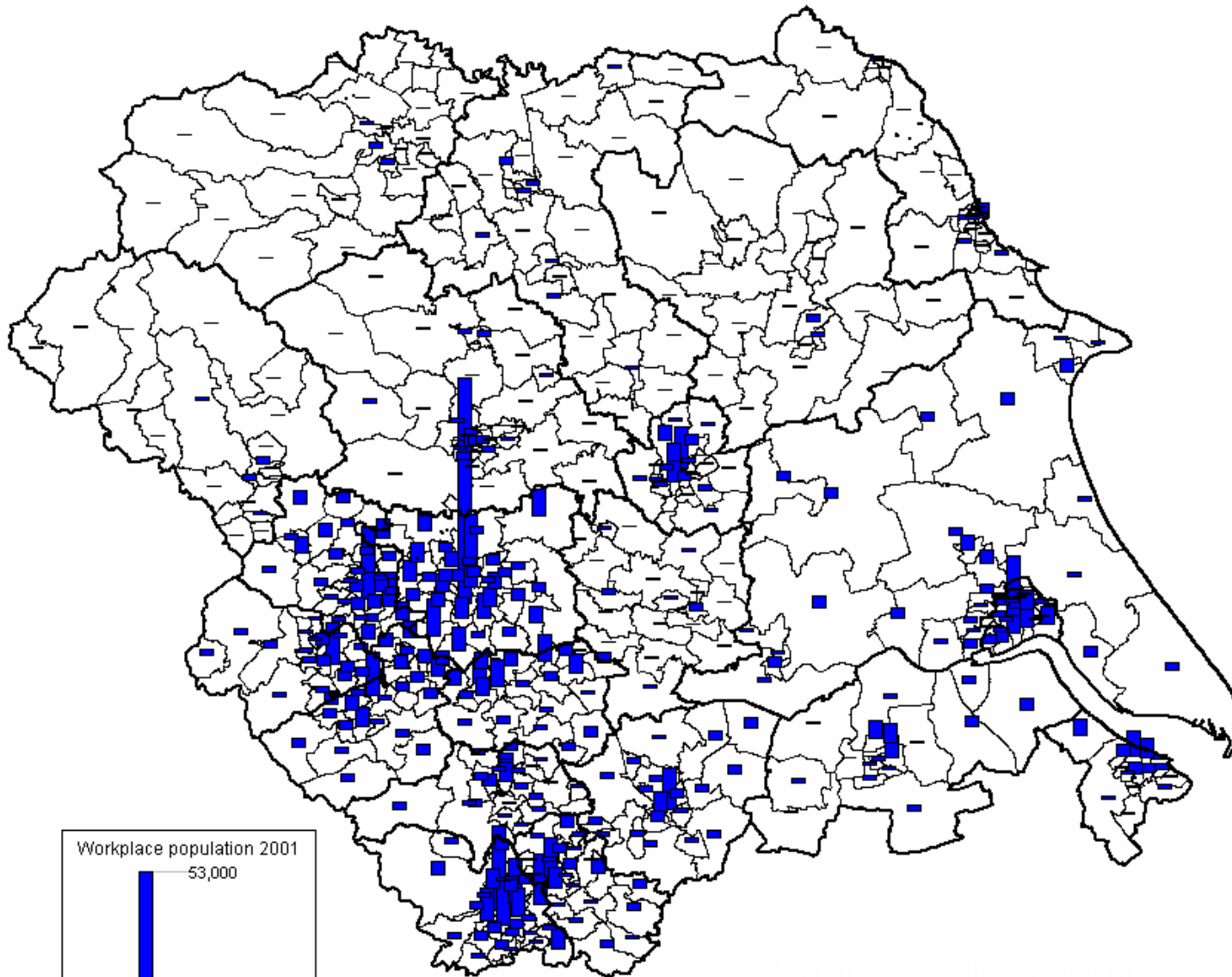


Overall loss (ratio <1.0) of all four NS-SeC.

Also, ratio lower for Low skill; better retention of higher skill.

But 27-city aggregate is driven largely by London

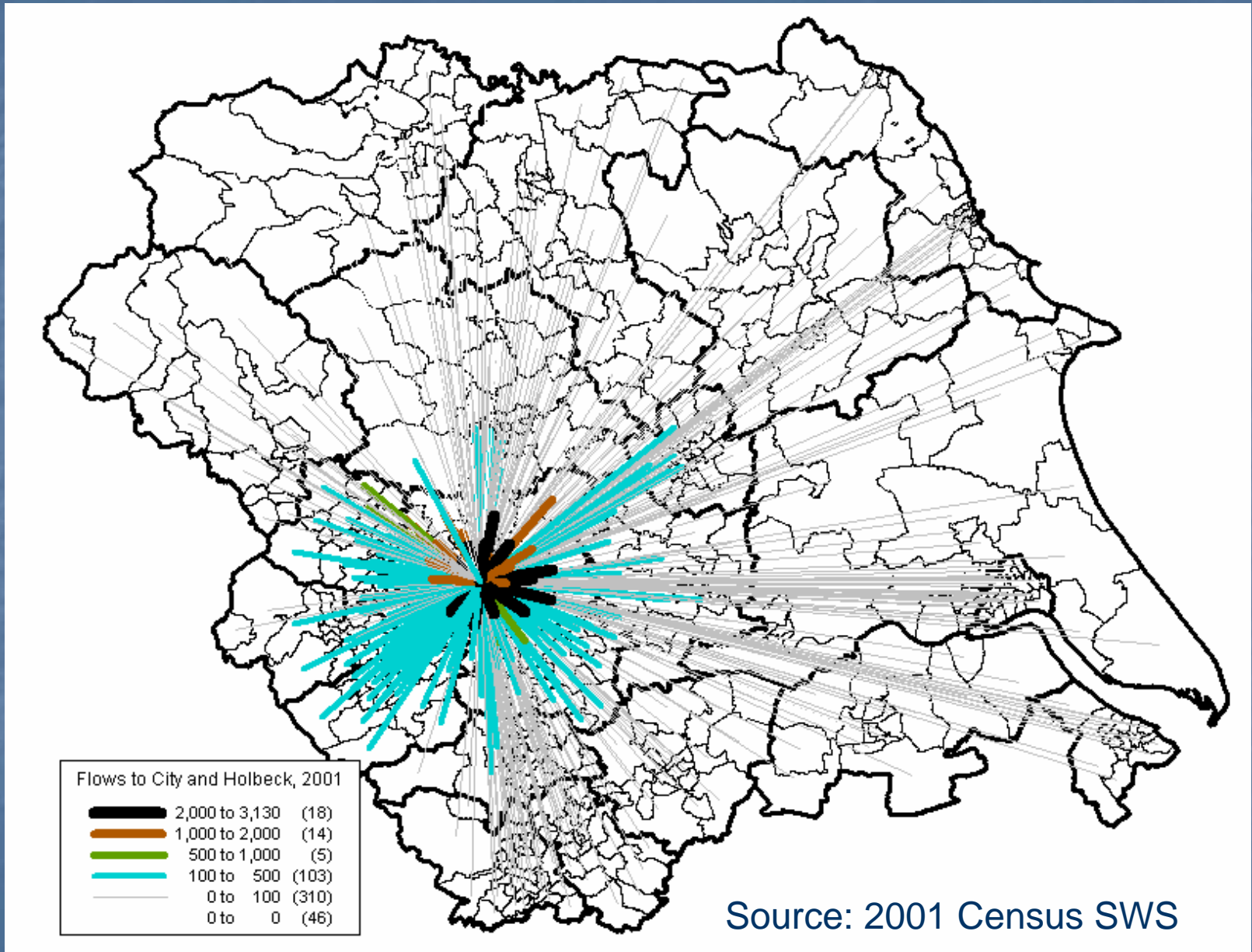
Example: SWS tells us vital information about our daily mobility



Over 100,000 people commute to work in the ward of City and Holbeck

Only two other wards in country have higher inflows of commuters

Example: Commuting flows to City and Holbeck from within Y&H



2001 Census interaction data issues:

General

- GRO-Scotland did a great job in preparing the interaction data delivered to CIDS and other users
- but ...
- a long wait:
 - Set 1 Moving Group tables were not available to users till the end of 2004
- geographical units were not quite as expected:
 - At district scale, Northern Ireland flow data for 18 Parliamentary Constituencies, not for 26 District Councils for which stock data is easily available
 - At ward scale, spatial units are a mixture of CAS wards (England, Wales, Northern Ireland) and ST wards (Scotland)

Geographical units used in 2001 SMS/SWS/STS

Country	Level 1	Level 2	Level 3
England	London Boroughs (33), Metropolitan Districts (36), Unitary Authorities (46), Other Local Authorities (239)	CAS wards (7,969)	Output areas (165,665)
Wales	Unitary Authorities (22)	CAS wards (881)	Output areas (9,769)
Scotland	Council Areas (32)	ST wards (1,176)	Output areas (42,604)
Northern Ireland	Parliamentary Constituencies (18)	CAS wards (582)	Output areas (5,022)
Total	Interaction districts (426)	Interaction wards (10,608)	Output areas (223,060)

2001 Census interaction data issues: Adjustment for Disclosure Control

- Several methods used by ONS in 2001
 - minimum thresholds of people and households before the release of data
 - record swapping between areas
 - removal or modification of planned tables
 - small cell adjustment method (SCAM)

Removal or modification of planned tables

- Level 3 (OA) SWS for Northern Ireland
 - This was originally planned but not followed through due to concern about small values in the tables
- Ethnic group disaggregated tables at level 1 in SMS and SWS
 - Classification collapsed for Northern Ireland - hence tables MG103N and W106N
- Industry disaggregated tables at level 1 in SWS
 - Table W105 had some categories collapsed due to concerns over disclosure

SCAM

- SCAM assumed to adjust values of 1 and 2 to values of 0 and 3
- SCAM was applied on the basis of *where* the data were collected
 - at the *destination* for migration data
 - at the *residence* for travel data
- SCAM was not applied to data collected in Scotland
 - *Except* for STS Level 3, to which it was applied
- MG106 was re-run to fix SCAM anomaly that caused internal inconsistency

Impact of SCAM on OA-OA migration flows

MG301 gives data on flows between output areas

Age by sex (2001 SMS Level 3 Table 1)

	<input type="checkbox"/> Total	<input type="checkbox"/> Male	<input type="checkbox"/> Female
<input type="checkbox"/> Total	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
<input type="checkbox"/> 0 - 15	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
<input type="checkbox"/> 16 - Pensionable age	<input type="checkbox"/> 7	<input type="checkbox"/> 8	<input type="checkbox"/> 9
<input type="checkbox"/> Pensionable age+	<input type="checkbox"/> 10	<input type="checkbox"/> 11	<input type="checkbox"/> 12

- Only those with destinations in Scotland have not been disclosure controlled
- Potential matrix of 223,060 origins by 180,456 destinations is > 40 billion cells, but delivered matrix much smaller because it omitted O/D pairs with no flows (real or after SCAM) in 'table total'

ONS provide adjusted counts for OA to OA flows for all 'interior' cells 5, 6, 8, 9, 11 and 12 where the total flow between an OA pair (cell 1) is non-zero

Impact of SCAM on OA-OA commuting flows

W301 gives data on flows between output areas

Method of travel to work (2001 SWS Level 3 Table 1)

	<input type="checkbox"/> All persons	Aged 16-74 in employment	
		<input type="checkbox"/> Full-time student	<input type="checkbox"/> Not full-time student
<input type="checkbox"/> Total	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
<input type="checkbox"/> Works or studies mainly at or from home	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
<input type="checkbox"/> Underground etc.	<input type="checkbox"/> 7	<input type="checkbox"/> 8	<input type="checkbox"/> 9
<input type="checkbox"/> Train	<input type="checkbox"/> 10	<input type="checkbox"/> 11	<input type="checkbox"/> 12
<input type="checkbox"/> Bus etc.	<input type="checkbox"/> 13	<input type="checkbox"/> 14	<input type="checkbox"/> 15
<input type="checkbox"/> Taxi	<input type="checkbox"/> 16	<input type="checkbox"/> 17	<input type="checkbox"/> 18
<input type="checkbox"/> Car - driver	<input type="checkbox"/> 19	<input type="checkbox"/> 20	<input type="checkbox"/> 21
<input type="checkbox"/> Car - passenger	<input type="checkbox"/> 22	<input type="checkbox"/> 23	<input type="checkbox"/> 24
<input type="checkbox"/> Motorcycle etc.	<input type="checkbox"/> 25	<input type="checkbox"/> 26	<input type="checkbox"/> 27
<input type="checkbox"/> Bicycle	<input type="checkbox"/> 28	<input type="checkbox"/> 29	<input type="checkbox"/> 30
<input type="checkbox"/> On foot	<input type="checkbox"/> 31	<input type="checkbox"/> 32	<input type="checkbox"/> 33
<input type="checkbox"/> Other	<input type="checkbox"/> 34	<input type="checkbox"/> 35	<input type="checkbox"/> 36

Interior cells

What do these counts tell us?

Impact of SCAM: Summary of OA-OA data for migrants with destinations in E&W and commuters with origins in E&W

Data in interior cells provided by ONS	MG301	W301
Total OA pairs where total persons is >0	1,466,386	5,929,874
Interior cells in data provided	8,789,316	130,457,228
Persons in those interior cells	5,507,660	23,965,449
Number of interior cells where count = 0	6,996,787	123,568,351
Number of interior cells where count = 3	1,763,068	6,192,493
Number of interior cells where count > 3	38,461	696,384
Persons in interior cells where count = 3	5,289,204	18,577,479
Persons in interior cells where count > 3	218,456	5,387,970
% of interior cells where count = 0 or 3	99.6%	99.5%
% of total persons where count = 3	96.0%	77.5%

Other effects of SCAM

- Previous example has shown the 'single table' effect of SCAM
 - There are also problems when comparing:
 - (a) flows between tables at one scale
 - (b) flows between tables at different spatial scales
- because SCAM is applied independently to each table at each level

Impact of SCAM when comparing tables: e.g. SMS at level 2

There are 2 tables at level 2 (wards) that contain total migrants

MG201 Age by sex

Age by sex (2001 SMS Level 2 Table 1)

	<input type="checkbox"/> Total	<input type="checkbox"/> Male	<input type="checkbox"/> Female
<input type="checkbox"/> Total	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
<input type="checkbox"/> 0	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
<input type="checkbox"/> 1-2	<input type="checkbox"/> 7	<input type="checkbox"/> 8	<input type="checkbox"/> 9
<input type="checkbox"/> 3-4	<input type="checkbox"/> 10	<input type="checkbox"/> 11	<input type="checkbox"/> 12
<input type="checkbox"/> 5-9	<input type="checkbox"/> 13	<input type="checkbox"/> 14	<input type="checkbox"/> 15
<input type="checkbox"/> 10-11	<input type="checkbox"/> 16	<input type="checkbox"/> 17	<input type="checkbox"/> 18
<input type="checkbox"/> 12-14	<input type="checkbox"/> 19	<input type="checkbox"/> 20	<input type="checkbox"/> 21
<input type="checkbox"/> 15	<input type="checkbox"/> 22	<input type="checkbox"/> 23	<input type="checkbox"/> 24
<input type="checkbox"/> 16-17	<input type="checkbox"/> 25	<input type="checkbox"/> 26	<input type="checkbox"/> 27
<input type="checkbox"/> 18-19	<input type="checkbox"/> 28	<input type="checkbox"/> 29	<input type="checkbox"/> 30
<input type="checkbox"/> 20-24	<input type="checkbox"/> 31	<input type="checkbox"/> 32	<input type="checkbox"/> 33
<input type="checkbox"/> 25-34	<input type="checkbox"/> 34	<input type="checkbox"/> 35	<input type="checkbox"/> 36
<input type="checkbox"/> 35-44	<input type="checkbox"/> 37	<input type="checkbox"/> 38	<input type="checkbox"/> 39
<input type="checkbox"/> 45-59	<input type="checkbox"/> 40	<input type="checkbox"/> 41	<input type="checkbox"/> 42
<input type="checkbox"/> 60-64	<input type="checkbox"/> 43	<input type="checkbox"/> 44	<input type="checkbox"/> 45
<input type="checkbox"/> 65-74	<input type="checkbox"/> 46	<input type="checkbox"/> 47	<input type="checkbox"/> 48
<input type="checkbox"/> 75+	<input type="checkbox"/> 49	<input type="checkbox"/> 50	<input type="checkbox"/> 51

MG203 Ethnic group by sex

Ethnic group by sex (2001 SMS Level 2 Table 3)

	<input type="checkbox"/> Total	<input type="checkbox"/> Male	<input type="checkbox"/> Female
<input type="checkbox"/> Total	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
<input type="checkbox"/> White	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
<input type="checkbox"/> All other ethnic groups	<input type="checkbox"/> 7	<input type="checkbox"/> 8	<input type="checkbox"/> 9

These cells provide flows of total migrants between 10,608 wards in the UK and 9,432 wards in UK excluding Scotland (aggregations of flows in interior cells)

What differences occur in non-zero ward-to-ward flow totals?

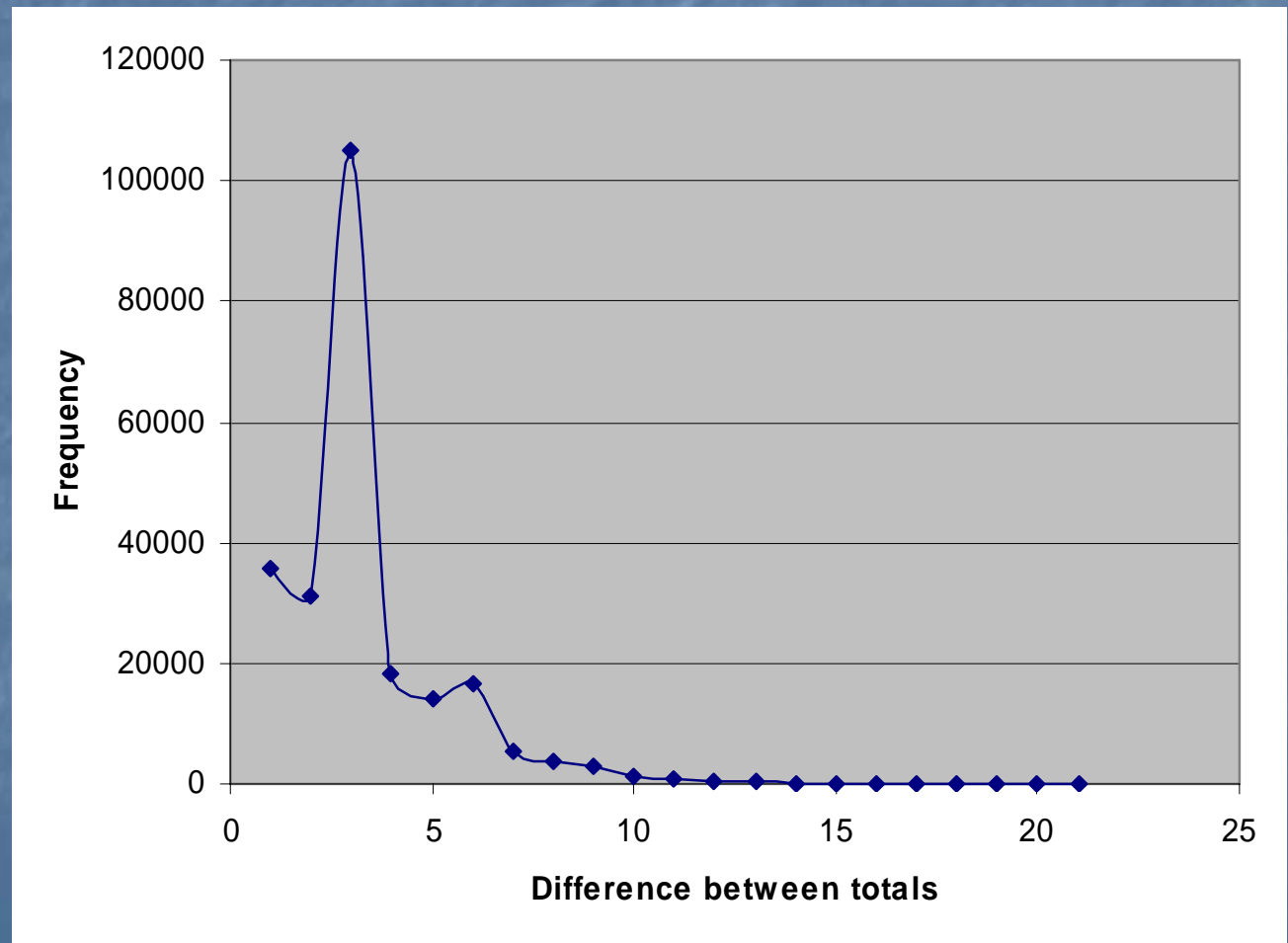
Comparing total migrants in MG201 and MG203: Distribution of **absolute** differences between the two

Over 1.1 million
ward to ward flow
totals

Totals are different
in 61% of cases

Distribution of
differences
dominated by 3s

Largest difference
is 21



Impact of SCAM when comparing flows between spatial scales

- What are the effects of SCAM when comparing **net migration rates** based on data from:
 - Table TT 37
 - SMS Table MG104and data aggregated up from:
 - SMS Table MG204
 - SMS Table MG301

Net migration comparison for **London boroughs**

Net migration rates per 1000

Borough	TT37	MG104	MG204	MG301
Top five on TT37				
City of London	4.87	5.01	11.70	3.34
Kingston upon Thames	3.33	3.95	2.76	3.14
Lambeth	0.00	0.55	-0.69	0.76
Sutton	-0.15	1.39	0.66	1.30
Barking and Dagenham	-0.49	-0.16	-0.23	-0.16
Bottom five on TT37				
Brent	-13.33	-12.94	-13.47	-12.68
Kensington and Chelsea	-13.50	-13.70	-14.49	-14.37
Hounslow	-14.04	-13.12	-14.24	-13.49
Ealing	-14.64	-15.08	-14.70	-14.84
Newham	-16.73	-18.04	-17.30	-18.05
Mean net rate	-7.10	-6.94	-7.34	-7.18

UK internal migration in 2000-01: How many migrants?

Seven different counts of total migration in 2001 SMS

Table	Level from which total derived		
	Level 1	Level 2	Level 3
Table 1 (Total):	6,202,016	6,267,740	6,164,996
Table 2 (Family status):	6,204,876	na	na
Table 3 (Ethnicity):	6,206,216	6,190,926	na
Table 4 (LTL illness):	6,205,128	na	na

Source: 2001 Census SMS tables

SCAM effects when making comparisons

- Another way of assessing the SCAM effect is to compare the data (e.g. in-migration) for two locations for which one has been modified (e.g. Leicester) and the other has not (e.g. Edinburgh)

SCAM comparisons at level 1

- Compare the two on frequency distribution of **all interior cells** in MG101
 - These are the cells actually subject to SCAM
- Compare the two on frequency distribution of **overall totals** in MG101
 - These are the most commonly used values and are sums of SCAMed cells

Table MG101

Age by sex (2001 SMS Level 1 Table 1)

Add selected cells Select all Clear all			
	<input type="checkbox"/> Total	<input type="checkbox"/> Male	<input type="checkbox"/> Female
<input type="checkbox"/> Total	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
<input type="checkbox"/> 0	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
<input type="checkbox"/> 1-2	<input type="checkbox"/> 7	<input type="checkbox"/> 8	<input type="checkbox"/> 9
<input type="checkbox"/> 3-4	<input type="checkbox"/> 10	<input type="checkbox"/> 11	<input type="checkbox"/> 12
<input type="checkbox"/> 5-9	<input type="checkbox"/> 13	<input type="checkbox"/> 14	<input type="checkbox"/> 15
<input type="checkbox"/> 10-11	<input type="checkbox"/> 16	<input type="checkbox"/> 17	<input type="checkbox"/> 18
<input type="checkbox"/> 12-14	<input type="checkbox"/> 19	<input type="checkbox"/> 20	<input type="checkbox"/> 21
<input type="checkbox"/> 15	<input type="checkbox"/> 22	<input type="checkbox"/> 23	<input type="checkbox"/> 24
<input type="checkbox"/> 16-17	<input type="checkbox"/> 25	<input type="checkbox"/> 26	<input type="checkbox"/> 27
<input type="checkbox"/> 18-19	<input type="checkbox"/> 28	<input type="checkbox"/> 29	<input type="checkbox"/> 30
<input type="checkbox"/> 20-24	<input type="checkbox"/> 31	<input type="checkbox"/> 32	<input type="checkbox"/> 33
<input type="checkbox"/> 25-29	<input type="checkbox"/> 34	<input type="checkbox"/> 35	<input type="checkbox"/> 36
<input type="checkbox"/> 30-34	<input type="checkbox"/> 37	<input type="checkbox"/> 38	<input type="checkbox"/> 39
<input type="checkbox"/> 35-39	<input type="checkbox"/> 40	<input type="checkbox"/> 41	<input type="checkbox"/> 42
<input type="checkbox"/> 40-44	<input type="checkbox"/> 43	<input type="checkbox"/> 44	<input type="checkbox"/> 45
<input type="checkbox"/> 45-49	<input type="checkbox"/> 46	<input type="checkbox"/> 47	<input type="checkbox"/> 48
<input type="checkbox"/> 50-54	<input type="checkbox"/> 49	<input type="checkbox"/> 50	<input type="checkbox"/> 51
<input type="checkbox"/> 55-59	<input type="checkbox"/> 52	<input type="checkbox"/> 53	<input type="checkbox"/> 54
<input type="checkbox"/> 60-64	<input type="checkbox"/> 55	<input type="checkbox"/> 56	<input type="checkbox"/> 57
<input type="checkbox"/> 65-69	<input type="checkbox"/> 58	<input type="checkbox"/> 59	<input type="checkbox"/> 60
<input type="checkbox"/> 70-74	<input type="checkbox"/> 61	<input type="checkbox"/> 62	<input type="checkbox"/> 63
<input type="checkbox"/> 75-79	<input type="checkbox"/> 64	<input type="checkbox"/> 65	<input type="checkbox"/> 66
<input type="checkbox"/> 80-84	<input type="checkbox"/> 67	<input type="checkbox"/> 68	<input type="checkbox"/> 69
<input type="checkbox"/> 85-89	<input type="checkbox"/> 70	<input type="checkbox"/> 71	<input type="checkbox"/> 72
<input type="checkbox"/> 90+	<input type="checkbox"/> 73	<input type="checkbox"/> 74	<input type="checkbox"/> 75

Overall
total
cell (1)

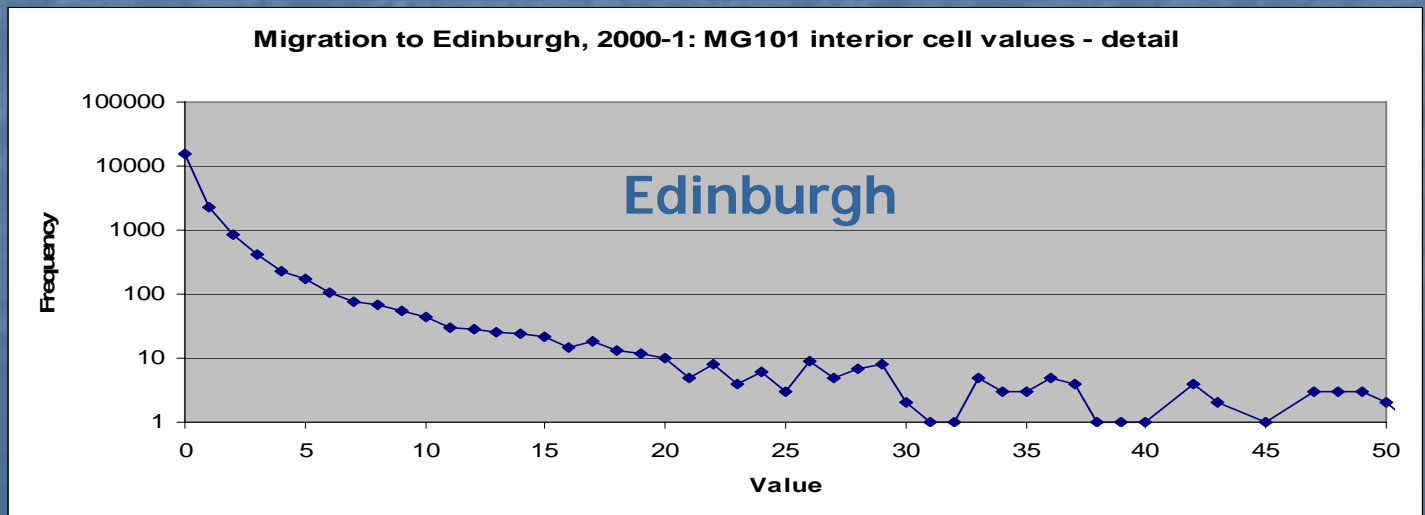
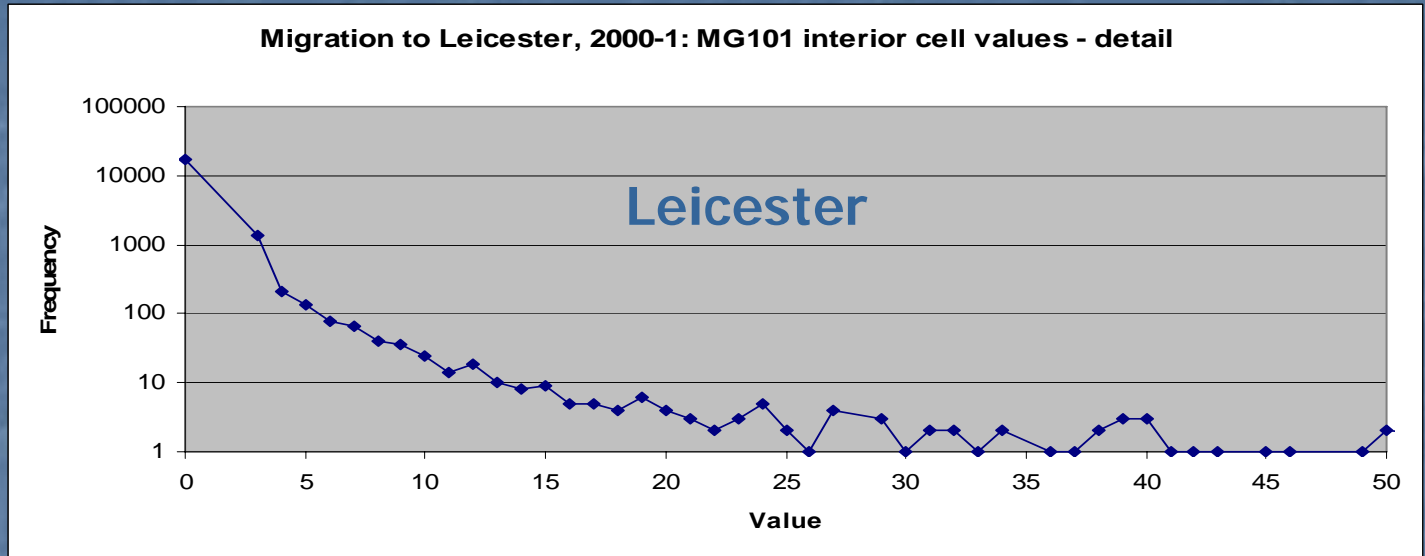
Interior
Cells (48)

Comparison of flows in interior cells in MG101

In-migration flows from other districts

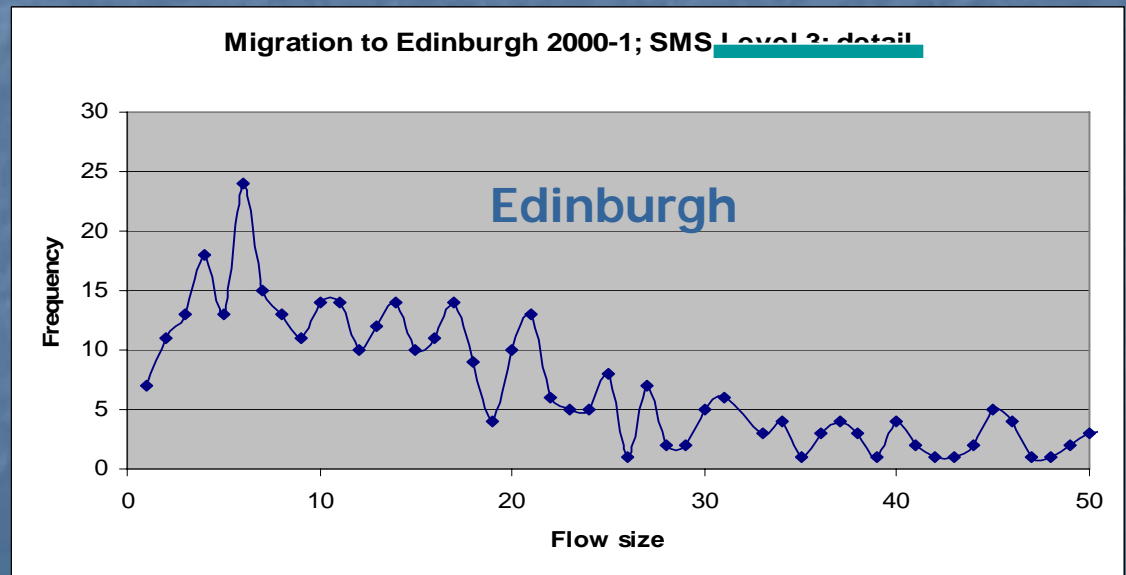
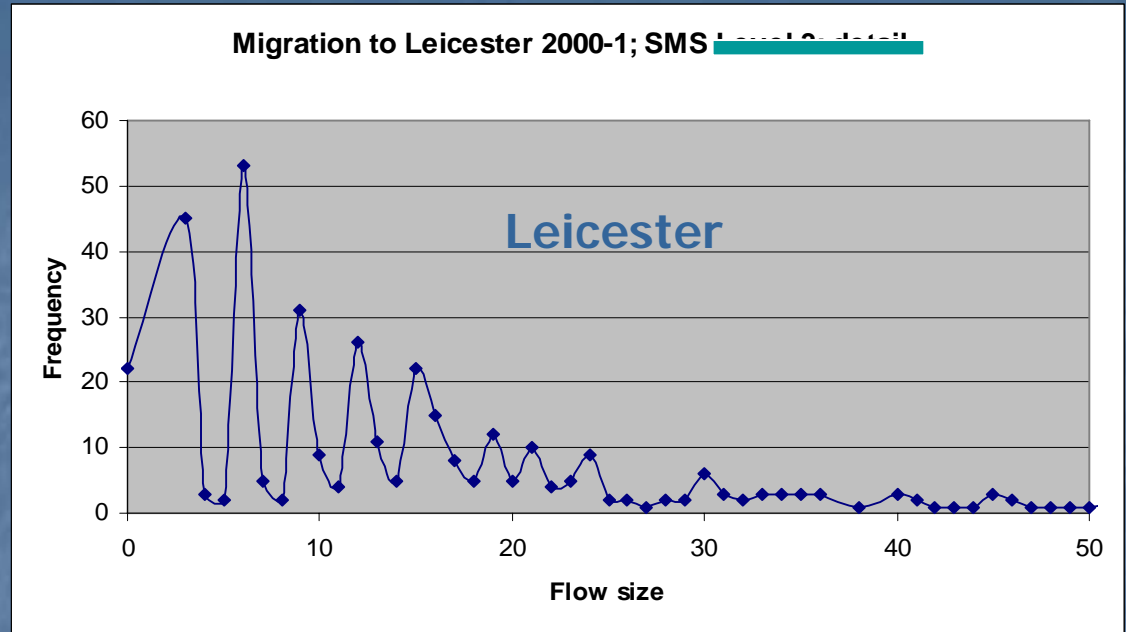
No values of 1 or 2 for Leicester

Otherwise distributions look similar



In-migration table
totals from
MG101

Leicester values
display obvious
grouping on 3 and
multiples of 3



2001 Census interaction data issues

Problems of Comparisons between Censuses

Problems associated with:

- definition and availability of variables
- measurement and adjustment of counts
- inconsistency in geographical areas

Problems of changing definition and availability - 1

- Confusion because of *nomenclature*: Set 1 (ward) and Set 2 (district) in 1991 but level 1 (district) and level 2 (ward) in 2001
- *Family status and occupation* tables for district migration data in 1991 but not in 2001, whereas *marital status* table in 1991 discontinued in 2001
- *New categorizations* of variables used in 2001 e.g. ethnic groups at district scale (but only white/non-white in NI)
- Occupation table based on the new *National Statistics Socioeconomic Classification (NS-SeC)* that replaced the classification of social class based on socio-economic group (SEG) used in 1991

Problems of changing definition and availability - 2

- No breakdown of *migrants from outside UK* by region/country of origin in 2001
- New concept of *moving group* in 2001: i.e. a single person or a group of people within a household who moved together from the same usual address one year before census day (though 'wholly moving household' element retained)
- Inclusion of *students* in the sense of people migrating to, from and at place of study (as result of treating term-time address as usual address in 2001, cf parental/vacation address in 1991)

Problems of the measurement and adjustment of counts

- SCAM adjustment of counts (already discussed)
- Unlike 1991, where *infants aged less than one* were excluded altogether from migrant counts, in 2001 they are included by giving them the migrant status of their 'next of kin' (in households only)
- *Under-enumeration* allowed for through imputation in 2001 (One Number Census), though incomplete
- 1991 category of *migrant with origin not stated* disappeared in 2001, BUT new category of *migrant with no usual address one year ago* introduced
- Difficulties in defining what are the *populations at risk* for some variables, e.g. moving groups, because no matching data for non-migrants in ODS or Area tables

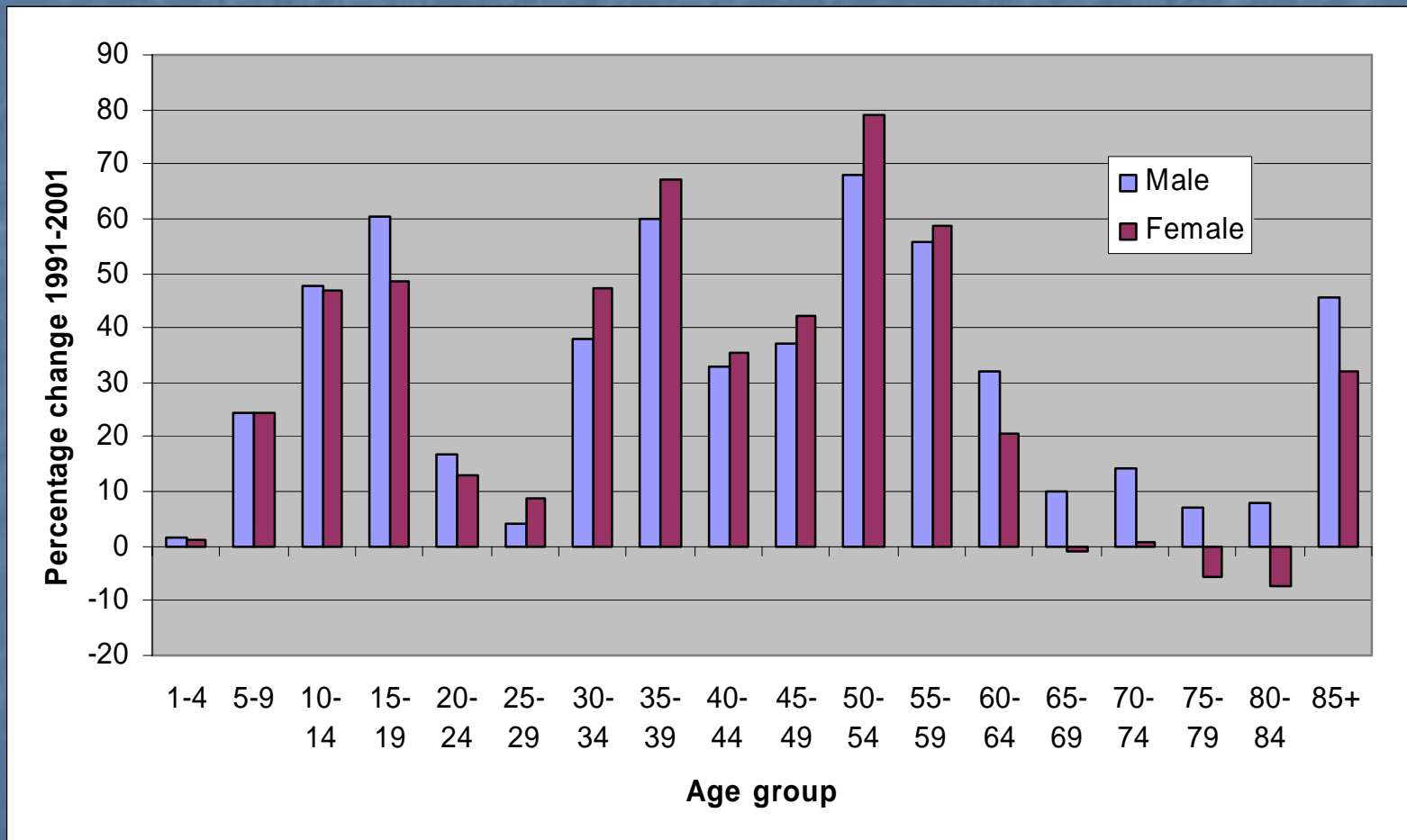
Problems of inconsistency in geographical areas

- *National*: no migration data for Northern Ireland in 1990-91
- *Regional*: local government re-organisation during the 1990s
- *Local*: OAs introduced to England, Wales and Northern Ireland in 2001 (Scotland 1991)

Hierarchy of zones and re-estimation

- **At supra-district scale:** CIDS have constructed sets of 'approximately consistent zones' from the initial set of 459 GB districts in 1991 and 408 GB districts in 2001:
 - 'district' geography (417 zones)
 - 'intermediate' geography (219 zones)
 - '100 zone' geography (100 zones)
 - 'city region' geography (47 zones)
 - 'Government Office Regions' (12 zones)
- **At sub-district scale:** CIDS also re-estimated various sets of sub-district flows from 1981 and 1991 Censuses for 2001 boundaries (Boyle and Feng, 2003)

Change (%) in migration in GB between 1990-91 and 2000-01 by age and sex



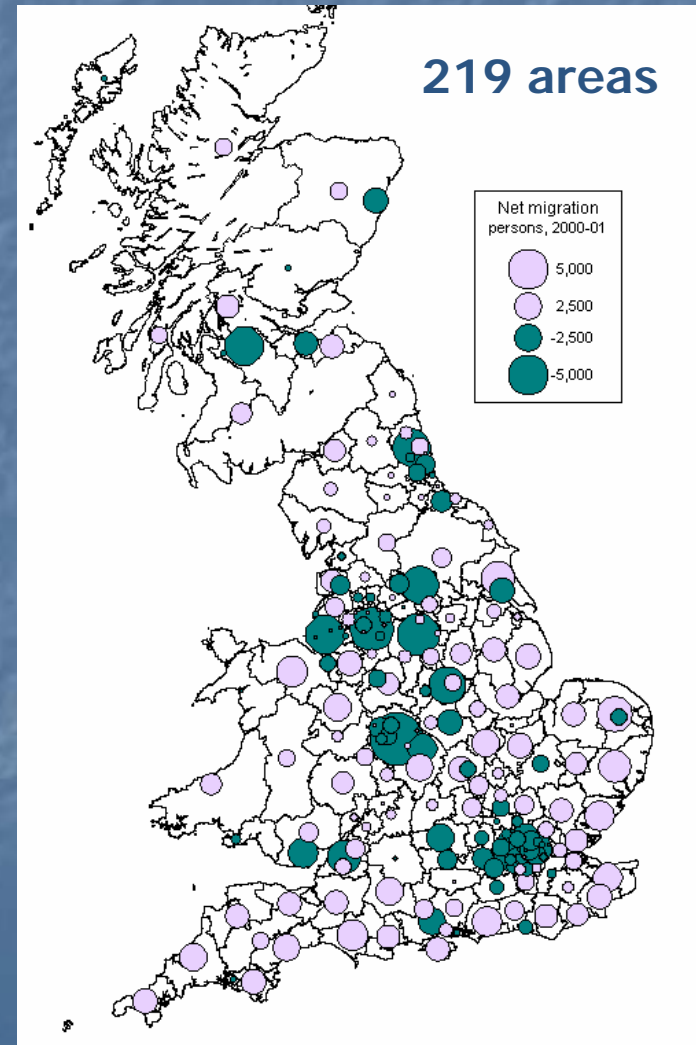
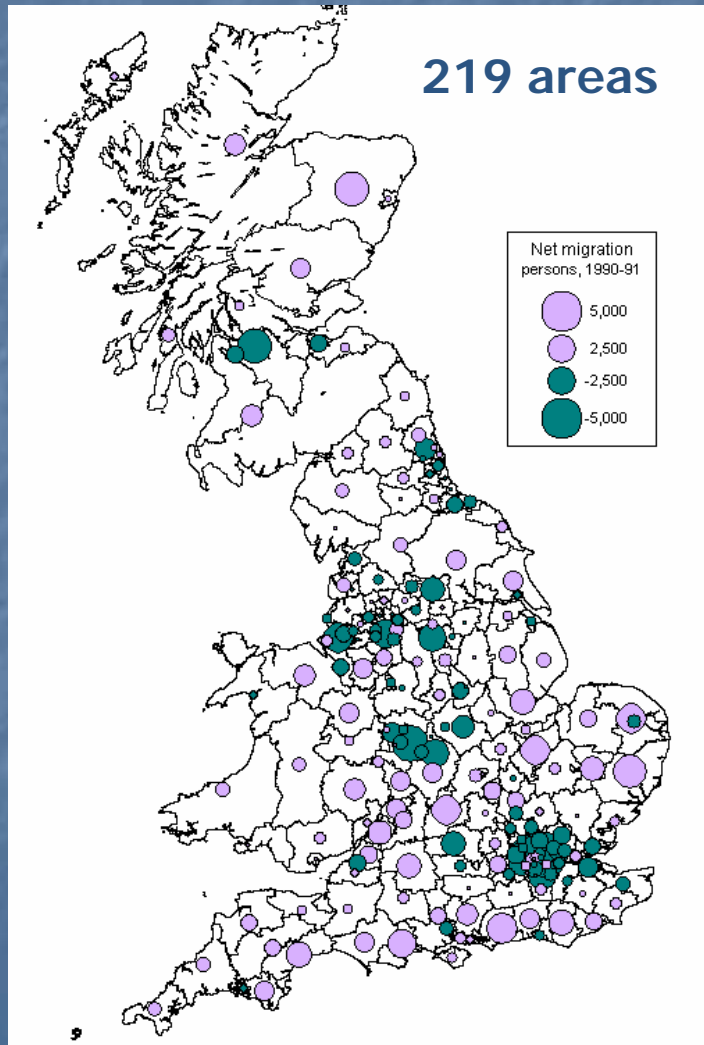
Sources: 1991 Census SMS Set 2 Table 3; 2001 Census SMS Level 1 Table 1

Total Migration in GB Compared 1990-01 and 2000-01

	Male		Female		Person
	Number	%	Number	%	Number
Primary 1990-91	2,293,059	48.9	2,395,121	51.1	4,688,180
MIGPOP 1990-91	2,644,586	50.3	2,615,217	49.7	5,259,803
Primary 2000-01	2,974,734	49.2	3,076,652	50.8	6,051,386
Infants	65,550	51.1	62,634	48.9	128,184
Students: Ec act FT	94,488	42.8	126,413	57.2	220,901
Students: Ec inact	231,217	48.6	244,736	51.4	475,953
Adjusted 2000-01	2,583,479	49.4	2,642,869	50.6	5,226,348
Change 91-01	-61,107		27,652		-33,455
% change 91-01	-2.31		1.06		-0.64

Sources: 1991 Census SMS Set 2; Simpson and Middleton (1999); 2001 Census SMS Set 1

GB Net migration (adjusted) for intermediate zones in 1990-91 and 2000-01



But not all the problems are resolved:

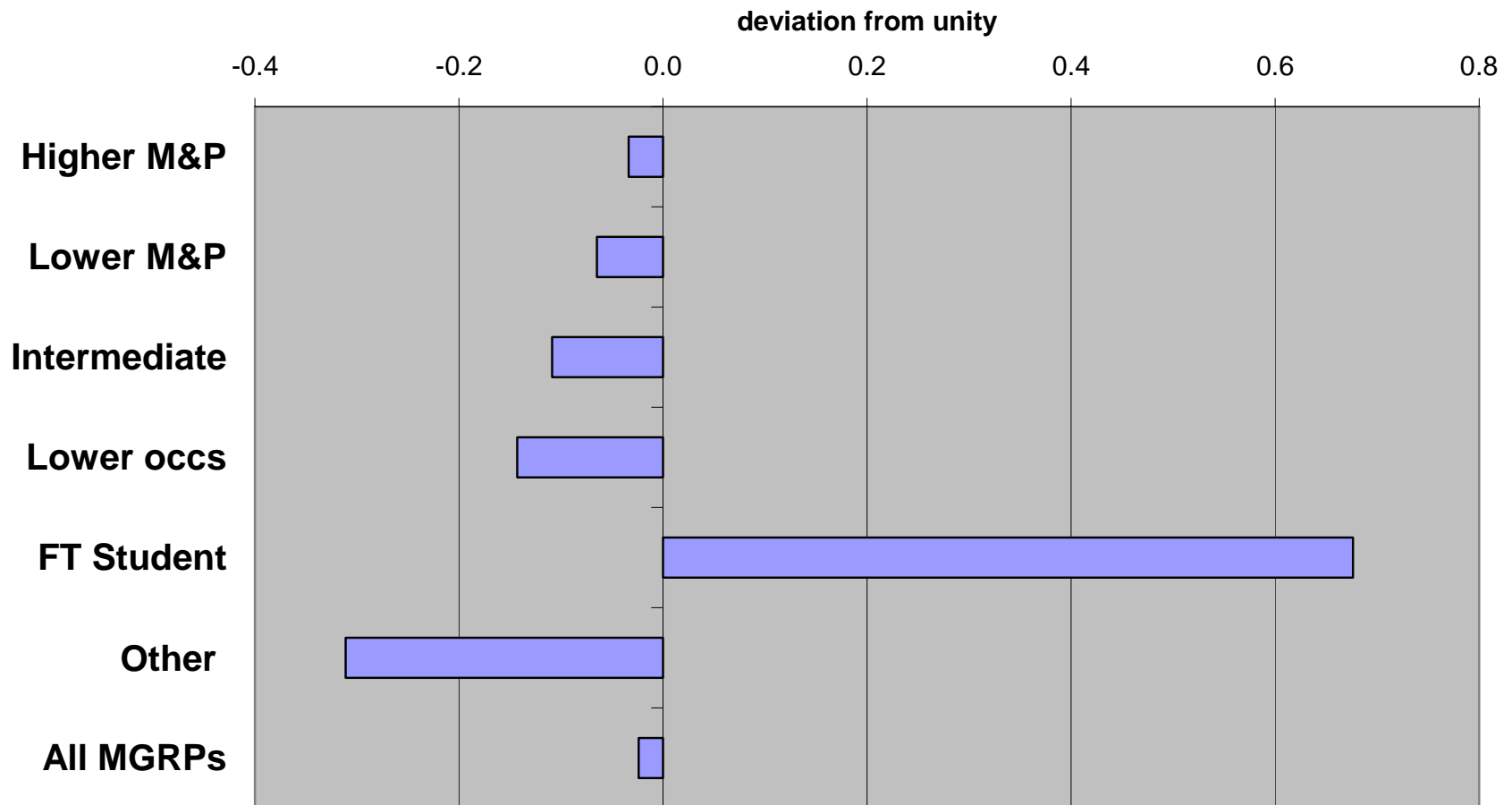
- The MIGPOP adjustment for the 1991 undercount is now seen as too large (after the 2001 Census results)
- Not all the migrant students in 2001 should be deducted, as some will have moved home with parents (deemed a migration already in 1991, even if parents moved while child was away at university!)
- The geography of recorded migration by recent graduates in 2001 (now from termtime address) will differ from that in 1991 (then from parental address)
NB: wouldn't even have been recorded as a migration in 1991 if they were back with parents then
- No allowance for differences between 'origin not stated' in 1991, and imputation plus 'no usual address one year ago' in 2001 (re. net migration by district)

Another example: calculating the effect of migration on the socio-economic profile of cities

- Take advantage of:
 - SMS matrix, allowing counts of gross migration flows between cities defined as groups of districts
 - Table MG109, classifying Moving Groups by NS-SeC on basis of economic position and occupation of RP
- But come up against:
 - Have to omit migrant residents who had no usual address last year, and migrants in communal estabs
 - Do not know the NS-SeC of non-RPs in Moving Groups with >1 member (2/3rds of MGs)
 - Do not know what was person's NS-SeC status one year ago, not even whether a student or not ...

... so university cities continually gain students,
and see outmigration of people in Higher M&P jobs

In/out ratio for MGRPs, by broad NS-SeC, for the 27 Cities together



Conclusions: Looking ahead

- A successful 2011 Census will *add to the rich set of interaction data* that we have from previous censuses
- Census agencies seem *more willing to learn* from past problems
- Migration and commuting seen as *definite question topics* for 2011
- Mindful of important *new developments* that have implications for future interaction data e.g. Continuous Population Survey, Integrated Population Statistics System

Recommendations for 2011 outputs

- *Either drop SCAM altogether* (no problems with Scotland) *or consider a less damaging method* of disclosure control that
 - (i) produces consistent counts across different tables at same level (if not between levels)
 - (ii) has less dramatic impact on OA-OA flows

Or consider providing access to unadjusted interaction data (aggregate totals perhaps) in safe setting
- Produce data for a *consistent set of districts and wards* across the UK
- Retain *classification systems used in 2001* as far as possible e.g. for ethnicity, occupation
- Produce a *full breakdown of region/country of origin for immigrant* counts
- Take note of whatever evaluations of the *Moving Group concept* have been undertaken by then

Recommendations for 2011 questions

- Include *question on economic or occupational status one year prior to the 2011 Census* or at least a question to identify those who were students one year ago
- Do not allow *migrants to tick a box 'no usual address one year ago'* or, if it is allowed, then ask also for actual address then (or, failing that, impute previous address as for other 'origin not stated' in 2001)
- Follow Scotland's example by *extending the journey-to-work question to include journey to place of study across the rest of the UK*
- Include *questions on other homes/workplaces and duration of stay* (see 2006 Census Test in Scotland) which will provide important new information about mobility behaviour

Email contacts

tony.champion@ncl.ac.uk

o.w.duke-williams@leeds.ac.uk

j.c.h.stillwell@leeds.ac.uk