UK subnational variations in fertility & infant mortality: 1981 to 2006

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Context

What happens when international migrants settle? Ethnic group population trends & projections for UK local areas

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Components for projection

• Base population
• Fertility rates (PN)
• Infant mortality rates (PN)
• Mortality rates (survival) (PW)
• Subnational migration rates (PHR)
• International migration rates (PB)
• Scenarios: using past trends to inform the future

• Exploring trends in fertility & infant mortality rates
• Which areas have similar experiences?
Prequel ... Demographic Transition
Long, long ago ...

Mortality decline: consensus
• Improved hygiene & living standards
• Fewer deaths from violence & war
• Reduction in infectious disease
• Lower infant mortality

Fertility decline: reasons speculative
• Urbanisation increases costs of children, rationality
• 19th Century, unlikely to be contraception & change in family values
• Fertility decline follows mortality decline ...

Fertility & infant mortality, 1850–1930

William Brass (1921–1999)
• Does lower 'child mortality' precede lower fertility?
• Regions in England & Wales, c. 1860s–1920s

Brass W & Kabir M (1979) Regional variations in fertility & child mortality during the demographic transition in England & Wales. In Regional Demographic Development
Hobcraft J & Rees P. Croon Helm
**Fertility & child mortality, 1860s–1920s**

Fertility decline influenced by infant mortality decline?

Probably not …

“Time-localised correlations of trends in areas are entirely consistent with the view that causative factors were largely the same for fertility as for child mortality” (Brass & Kabir 1979: 86)

But …

- Falls in fertility by region almost uniform
- Declines in child mortality vary geographically

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**Fertility & infant mortality, 1981–2006**

- Subnational fertility generally declining, largely due to ‘postponement’ (Tromans, Norman et al., 2008)
- Recent concerns over low fertility, especially in Scotland (Boyle, 2003; Boyle et al., 2007)
- Infant mortality declining, but not even geographically (Norman et al., 2008)
**The great baby divide**

Ten-year age gap opens up between new mothers in the North and South.

Women in the South of England are having children 10 years younger than those in the North, a study revealed yesterday.

A new mother in the North (left) is likely to be in her late 30s, while one in the South is likely to be in her early 20s. The research, carried out in the North and South, shows a significant difference in the age at which women have children. The average age for a first-time mother in the North is around 30, while in the South it is closer to 20.

The report also highlights the impact of higher education and employment on fertility rates. Women with higher education levels tend to delay having children until later in life, while those with fewer educational opportunities may have children earlier.

**Fertility & infant mortality, 1981–2006**

**Total Fertility Rates**


**Infant Mortality Rates**
Grouping local authorities for projection scenario modelling

Projection model needs fertility and infant mortality rates
Variations to be explored as scenarios

- >400 local authorities in the UK
- Impractical to develop scenarios for each LA
- Group LAs together with similar demographic experiences:
  - Fertility rates
  - Infant mortality rates

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Deprivation Quintiles

ONS Supergroups

[Graphs showing trends in fertility and infant mortality rates over years from 1981 to 2006, categorized by deprivation quintiles and ONS supergroups.]

- Contemporary & time-offset correlations suggest changes in fertility levels & infant mortality levels unlikely to be associated
- Inconsistent picture across deprivation & Supergroups

Factors relating to fertility & infant mortality?

- Social Class
- Educational achievement
- Unemployment
- Tenure
- Deprivation
- Ethnicity
- Marriage
- Students
- Armed forces
- Country

Fertility & infant mortality can be modelled in 1991 & 2001

- Consistent geography & variables

Area variation in fertility

1991 TFR
Adj R sq 0.58

- Northern Ireland: ---
- Scotland: ---
- Wales: -
- log Persons per hectare: ---
- log % Chinese ethnicity: ---
- log % Pakistani or Bangladesh ethnicity: ---
- log % Students: ---
- Townsend index: ---

2001 TFR
Adj R sq 0.57

- Northern Ireland: ---
- Scotland: ---
- Wales: -
- log Persons per hectare: ---
- log % Chinese ethnicity: ---
- log % Pakistani or Bangladesh ethnicity: ---
- log % Students: ---
- Townsend index: ---

Std Beta Coefficient

-7.5 -5.0 -2.5 0.0 2.5 5.0 7.5
Area variation in infant mortality

1991 IMR
Adj R sq 0.33

2001 IMR
Adj R sq 0.36

Unexplained variation in TFRs

1991
TFRs Residuals

2001
TFRs Residuals

Unexplained variation in TFRs

1991 of 2001
TFRs = 0.77 ***
Residuals = 0.58 ***
Unexplained variation in IMRs

Classification of fertility & infant mortality
k-means clusters of rate trends & 'predictors'

Fertility
Classification of fertility & infant mortality
k-means clusters of rate trends & ‘predictors’

Infant Mortality

Classification of fertility & infant mortality
Fertility Infant Mortality

Total Fertility Rates
Age-Specific Fertility Rates

Cluster London Borough
1 City of London & Westminster, Camden, Hammersmith & Fulham, Richmond, Wandsworth & Chelsea, Lewisham
2 Barnet, Bromley, Harrow, Kingston upon Thames, Richmond upon Thames
3 Brent, Croydon, Enfield, Ealing, Greenwich, Haringey & Hillingdon, Hounslow, Lambeth, Richmond, Southwark, Sutton, Tower Hamlets, Wandsworth
4 Barking & Dagenham, Havering, Hounslow
5 Barking & Dagenham, Havering

Clusters London Borough
1 Brent
2 Barnet, Bexley, Bromley, Croydon, Enfield, Greenwich, Haringey, Hillingdon, Kingston upon Thames, Lambeth, Richmond, Southwark, Sutton, Tower Hamlets, Wandsworth
3 Camden, Hammersmith & Fulham, Harrow, Hounslow, Kingston upon Thames, Lambeth, Richmond, Southwark, Sutton, Tower Hamlets, Wandsworth
4 Barking & Dagenham, Havering, Hounslow
5 City of London, Enfield, Ealing, Greenwich, Haringey, Hounslow, Lambeth, Richmond, Southwark, Sutton, Tower Hamlets, Wandsworth, Wandsworth
1860s-1920s cf. 1981-2006 …
1860s–1920s, Brass …
• Falls in fertility by region, preservation of relative differentials
• Declines in child mortality vary geographically
• Time-localised correlations … causative factors largely the same for fertility as for child mortality?

1981–2006
• Variations over time in fertility very similar across LAs, differentials largely preserved. Declines in infant mortality some variation
• Why the rise in fertility between 2001 & 2006? Will this continue?
  • Economic boom? Demographic momentum? Immigration?
• No consistent relationship between TFR & IMR suggest different ‘causative’ factors
  • For 1991 & 2001 some influential variables in common: deprivation & Pakistani & Bangladeshi ethnicity, London deserving special attention

Projections of future population: scenarios
• Rates can be applied to groups of demographically similar areas