The Great Population Scare
British Demographic Projections, 1956-75

Gavin Ross

Summary

Official forecasts of future population growth rose rapidly between 1956 and 1966, and then declined steadily until 1975 when they became fairly accurate. The main source of error was uncertainty about future birth rates.

Predictive Demography

How do we predict future population growth, and what assumptions should we make? In the light of current concerns from all sides of the political spectrum, from anti-immigrant lobbies to anti-housing campaigners, it is interesting to examine the state of the art of predictive demography in the past.

From 1956 onwards the Central Statistical Office included in its Annual Abstracts of Statistics tables of population projections up to 40 years ahead. A short note on the methodology was also given. The starting point for each table was the current age-sex distribution of the populations of England and Wales, Scotland, Northern Ireland and the United Kingdom. These were estimated from the previous census, updated by registered births and deaths, and estimates of immigration and emigration. The easiest part was to estimate the death rate for each age group, starting with current mortality rates with projections for future trends based on expected medical advance and the absence of any major catastrophe. Net immigration and emigration was considered small at the time, and the age-sex distribution of emigrants and immigrants was not

defined in the notes, presumably being assigned on a proportional basis. The big problem was to estimate the birth rate, applied to women between the ages of 15 and 44, and this was adjusted every year, based on revised data from the previous year. The age distribution of mothers was not stated, but presumably was considered constant over the period of projection, although variations in age of marriage or decisions to start a family have significant effects on future projections.

The simplest way of looking at the changes in the projections is to consider how the projections for a particular future year varied as the assumptions changed. In Table 1 the estimated UK population in millions is given for the years 1980, 1990 and 2000, together with the actual population in the year of estimation. Estimates are interpolates when the actual year is not used. The published values are to five significant figures, but are here rounded off.

Table 1. Population projection in millions for UK, from *Annual Abstracts of Statistics*

Year of publication	Current population	Estimate for 1980	Estimate for 1990	Estimate for 2000
1956	51.2	53.3	53.1	52.5
1957	51.4	54.8	55.4	55.6
1958	51.7	55.9	57.1	58.1
1959	51.9	56.4	58.3	60.1
1960	52.2	56.5	58.5	60.3
1961	52.5	57.7	60.6	63.8
1962	52.9	60.1	63.5	67.5
1963	53.4	60.8	65.2	71.2
1964	54.2	60.7	65.4	71.6
1965	54.2	61.4	67.0	74.7
1966	54.6	61.2	66.8	74.6
1967	54.9	60.0	65.1	72.1
1968	55.2	59.5	64.2	70.3
1969	55.4	59.3	63.2	68.2
1970	55.6	58.6	62.0	66.1
1971	55.8	58.6	61.9	66.0
1972	55.9	59.2	60.1	62.7
1973	55.9	57.0	59.5	62.1
1974	56.0	56.2	57.8	59.2
1975	56.1	56.2	58.0	59.6

The 1975 estimates may be compared with the eventual outturn of 55.9 million in 1980, 57.4 million in 1990 and 59.6 million in 2000.

In the years 1965-6 when estimates peaked there was talk of the need for a new Birmingham every year at the end of the century. At the same time concern about Commonwealth immigration led to the panic legislation of 1968 and Enoch Powell's infamous quotation. Yet the level of immigration was a minor factor in the population projections compared with the errors in predicting the changing birth rate. Any change in the birth rate parameters affects the numbers of potential mothers within 20 years, whereas changes in the death rate take much longer to affect the projections. The accompanying notes giving the assumed parameters are given below.

Assumptions for Death Rates

From 1956-62 it was assumed that current age and sex-specific death rates were used at the start, and would decline by 50 per cent over 25 years for the under 45s, and by a lesser amount pro-rata up to age 90 after which the death rate would remain the same. After 1963 the assumed rate of decline was lessened and was expect to halve in 40 years. The rate of decline was further lessened after 1976.

Assumptions for Birth Rates

1956: The birth rate per 1000 women aged 15-44 would decline from 74 in 1955 to 69 in 1980 and then remain constant.

1957: There would be 795 thousand births per year for 15 years, 805 for the next ten years and 785 thereafter.

1958: 835 thousand per year for 15 years, 830 for the next 10 years and 850 thereafter.

1959: 855 thousand for 5 years, 870 for 10 years, rising to 935 in 1998.

1960: 860 thousand for 5 years, rising to 935 in 1999.

1961: 880 thousand for 5 years, rising to 1100 in 2000.

1962: 950 thousand next year, then 940 for 5 years, rising to 1160 by end of century.

1963: 989 thousand next year, then 1008 for 4 years, rising to 1310 by end of century.
1964: 1001 thousand, rising to 1075 in 1980, 1238 in 1990 and 1332 in 2000.
1965: 1024 thousand, rising to 1136 in 1980, 1364 in 1990 and 1527 in 2000.
1966: 1004 thousand, rising to 1159 in 1980, 1382 in 1990 and 1565 in 2000.
1967: 973 thousand, rising to 1116 in 1980, 1316 in 1990 and 1462 in 2000.
1968: 956 thousand, rising to 1108 in 1980, 1268 in 1990 and 1387 in 2000.
1969: 955 thousand, rising to 1046 in 1980, 1175 in 1990 and 1251 in 2000.
1970 and 1971: 916 thousand, rising to 1020 in 1981, 1121 in 1991 and 1165 in 2001.
1972: 871 thousand, rising to 1072 in 2011.
1973: 816 thousand, rising to 954 on 1981, 1015 in 1990 and 1079 in 2011.
1974: 751 thousand, rising to 960 in 1989, falling to 845 in 2001, rising to 950 in 2012
1975: 722 thousand, falling to 699 and then rising to 972 in 1989, then falling to 848 in 2001 and rising to 978 in 2013.

The methodology changed several times, and from 1974 made use of changing numbers of women in the assumed age of motherhood, rather than simple linear interpolation.

Actual numbers

The actual numbers of live births in the following years, in thousands, were as follows:

Table 2: UK Live Births in thousands, 1956-2002

Year	1956	1957	1958	1959	1960	1961	1962	1963
Births	825	851	871	879	918	944	976	990

Year	1964	1965	1966	1967	1968	1969	1970	1971
Births	1015	998	980	962	947	920	904	902

Year	1972	1973	1974	1975	1976	1977	1978	1979
Births	834	780	737	698	676	657	687	735

Year	1980	1981	1982	1983	1984	1985	1986	1987
Births	754	731	719	721	730	751	755	776

Year	1988	1989	1990	1991	1992	1993	1994	1995
Births	788	777	799	793	781	762	751	732

Year	1996	1997	1998	1999	2000	2001	2002
Births	733	727	717	700	679	669	669

The number of women of childbearing age, defined as 15-44 years of age, did not vary so markedly, and remained roughly in proportion to the total population, as shown in Table 3, using census years only.

Table 3: UK Women, in thousands, aged 15-44

Year	1951	1961	1971	1981	1991	2001
Women	10918	10425	10691	11762	12455	12314

The age of the mother was not given until 1964, but from the tables of maternal age it is possible to show the change in average age of mothers over time.

Table 4: Mean age of UK mothers at 10-year intervals, and percentage of mothers under 30 years of age.

Year	1964	1974	1984	1994	2004
Mean age	27.2	26.1	26.9	28.4	29.4
% Under 30	71	80	73	62	51

Projected net migration by year of prediction

1956: Net outward migration 32000 per year.
1957-8: Net outward migration 27000 per year
1959-61: Net outward migration 30000 per year.

1962: Net inward migration 100000 in 1962, then 50000 per year until 1975, then zero.
1963: Net inward migration 60000 in 1963, then falling to 20000 in the long term.
1964: Net inward migration 20000 per year, equal males and females.
1965: Net inward migration 20000 per year, three males to one female.
1966: Net inward migration 10000 per year, two males to three females, falling to nil in 1975.
1967: Net outward migration 75000 falling to nil in 1971.
1968: Net outward migration 47000, and 20000 from 1977.
1969: Net outward migration 20000 for all future years.
1970-1: Net outward migration 30000 for all future years.
1972-3: Net outward migration 50000 per year.
1974: Net outward migration 19000 rising to 50000 in 1978.
1975: Net outward migration 27000, falling to 16000, then rising to 32000 after 1979.

The projected figures were given to the nearest thousand, giving a spurious suggestion of accuracy. Of course there was no requirement to publish confidence intervals, or any cautionary notes relating to the possible inaccuracy of any of the assumptions. No politician or newspaper reporter would bother to compare one volume with previous volumes to note the almost capricious changes in the assumptions. The figures were required because they were needed by planners of employment, housing, schools and hospitals, and by actuaries for the estimation of the needs of pension funds. But for the sensationalists they provided all the ingredients for media-induced panic.

The emigrants mainly left for America, the old Commonwealth and Europe, while the immigrants most easily recognised as such were from the new Commonwealth. Emigrants left from all over the UK while immigrants tended to concentrate in particular areas. This made it more difficult to counter racist fears using statistical arguments alone. It was also widely assumed that immigrants had higher birth rates, and were younger on average than emigrants. These factors were not mentioned in the demography notes.

Conclusions

By the 1970s it was officially admitted in the notes that "projections are not regarded as a forecast as populations cannot be forecast over 40 years." In 1984 there were further apologies for possible errors, and projected improvements in mortality were reduced again.

Could the projections have been more accurate? Were the demographers in 1960 supposed to know about improved access to family planning and abortion services? Should the population be disaggregated to account for different parameters for different subgroups, defined by region, race, religion or social class? To what extent is migration related to economic performance, changes in the law, crises overseas or even climate change? Is the census adequate to correct for creeping errors over each decade, especially if it is grossly in doubt, as in 1991? How can an assumed invisible population of illegal immigrants be measured, or is it anybody's guess? As we enter another period of population panic, can today's demographers improve on the performance of their predecessors?

References

Central Statistical Office (1956-76) Annual Abstracts of Statistics.

Gavin Ross
Visiting Worker,
Biomathematics and Biotechnology, Rothamsted Research,
Harpenden, Herts AL5 2JQ
Gavros.ross@btopenworld.com