Cohort Birth Order, Parity Progression Ratio and Parity Distribution Trends in Developed Countries

(extended abstract)

Introduction

The present paper is intended to analyze in detail levels and trends of births by birth order, parity progression ratios (PPRs), and parity distributions in developed countries. It is part of a large project which has been analyzing childbearing trends and prospects in 35 advanced countries using the cohort method. The project has been in progress for the past six years (Frejka, Sardon 2004 and 2005).

Background

Up until the end of the 20th century most of fertility research as well as policy discussions and decisions were based on period indicators, crude birth rates, total fertility rates and net reproduction rates. There were exceptions represented mainly by Hajnal (1947), Henry (1953), Ryder (1951, 1986), and Whelpton (1954) who developed the cohort approach to fertility research. Ryder (1964) also elaborated the technique of "demographic translation," namely the interrelationships of period and cohort fertility measures. Generally, the cohort approach was considered important and interesting in academia, but it had limited impact in the "real" world.

Hajnal (1947) demonstrated theoretically and empirically the apparent dilemma of period rates increasing (or declining) considerably at the same time as cohort rates remained stable. The principal contribution was to reveal that changes in the timing of cohort childbearing may, and frequently do, bring about wide fluctuations of period fertility rates. He introduced the concepts of "postponement," "anticipation" and "making up" of childbearing and clarified their effects on period fertility rates, namely he demonstrated why "family size" can and usually remains relatively stable yet period rates may, and at times do, "fluctuate widely."

More recently the inadequacy of period rates was again realized by J. Bongaarts and G. Feeney, and in their seminal 1998 paper they refined Ryder's translation technique, they elaborated a method intended to eliminate the tempo effects on total period fertility rates (TPFRs) and introduced the concept of the adjusted total fertility rate (ATFR). The work of Bongaarts and Feeney (1998) was picked up by the profession and touched off a stream of criticism, applications and attempts to further refine the method (for instance, Kim, Schoen 2000; Kohler, Philipov 2001; Kohler et al., 2002; Philipov, Kohler 2001; Schoen 2004; Sobotka 2003, 2004; van Imhoff, Keilman 2000; Zeng, Land 2001). To date almost all efforts to refine period TFRs, to adjust TFRs, to improve the way in which contemporary fertility is measured, depicted and presented take the cross-sectional period approach as the point of departure, as the base for a better understanding of contemporary fertility.

In 1999 Calot and Frejka designed a project to complement this work using the cohort analysis approach. Preliminary findings were published in the *Population and Development Review* (Frejka, Calot 2001). Since then about a dozen papers were published, and in 2004 a comprehensive report came out in book form (Frejka, Sardon 2004) and an update was presented at the 2005 IUSSP Conference (Frejka, Sardon 2005).

The data

The project analyzes a body of data on fertility for a large number of cohorts in 35 countries. These include the majority of European countries, major overseas countries with populations that were principally of European origin, and Japan. The data were gathered at the *Institut National d'Études Démographiques* in Paris since the end of the 1970s and since 1996 by the *Observatoire Démographique Européen.* In addition, data for several non-European low-fertility countries were obtained.

For the birth order, PPRs and parity distribution analysis the range of countries, as well as the numbers of cohorts, are not as many as those for the total numbers of births. Only 27 countries and a lesser number of cohorts were available for analysis. The attached table provides a sense of the volume of the data set. These data are based strictly on registration. If and when some total birth order cohort fertility rates are estimated the techniques were significantly tightened compared to earlier work to allow at most five percent of the total to be calculated by estimation.

Findings of the overall project to date

The analysis for the low-fertility countries presented in the book (Frejka, Sardon 2004) and in the IUSSP paper (Frejka, Sardon 2005) came to the following principal substantive conclusions: Childbearing has never been as low as at the outset of the 21st century. A moderate fertility decline is likely to continue during the first decade. A fertility increase in the foreseeable future is unlikely. Incipient signs of fertility plateaus are apparent. Rates of recuperation among older women are slowing down. A low fertility plateau might be reached in individual countries with completed cohort fertility as low as 1.3 or less and probably no higher than 2.0 births per woman. The analysis implies that increases of total period fertility rates, including those of adjusted TFRs, in most countries are not a reflection of increases in cohort childbearing, but a result of lesser postponement of births.

Regarding methodology the case is argued that the application of a set of cohort fertility measures (total and cumulated) and procedures in conjunction with a theoretical framework provides a realistic understanding of contemporary fertility.

The present paper is intended to investigate in greater detail issues of birth order, PPRs, and parity distributions with the goal of furthering the understanding of the facts and mechanisms generating contemporary low fertility. Furthermore, we wish to be able to make judgments about developments in the near future and to discuss policy implications.

Selected preliminary findings regarding birth orders, parity progression ratios, and parity distributions

Total first birth cohort fertility rates (TFBCFRs) were quite stable among cohorts born during the 1930s and often also among the 1940s birth cohorts in most countries. They tended to be high in the formerly socialist countries, between 0.92 and 0.96 first births per woman. In the Western countries the TFBCFRs were lower, between 0.85 and 0.89 first births per woman. In almost all countries a general decline of the TFBCFRs followed. In some countries these rates declined already among the cohorts of the 1950s, and a general decline was under way in the 1960s birth cohorts.

The decline was gradual in the Western countries; at first slow in the formerly socialist countries but then it accelerated, especially among the cohorts born in the mid- to late 1960s. For example, some 1965 birth cohorts reached TFBCFRs around or below 0.80 first births per woman, Finland (0.80), England & Wales (0.79), Austria (0.78). These data imply that twenty percent or more of women in these cohorts may remain childless. TFBCFRs of the mid- to late 1960s cohorts in the formerly socialist countries were still around 0.85 to 0.93 per woman, but declining rapidly.

Second birth and third birth TCFRs were also declining in successive cohorts; at faster rates in the formerly socialist countries than in the West. Consequently, the birth cohorts of the 1960s in the formerly socialist countries experienced higher first birth order TCFRs (see above), but lower second and third order TCFRs compared to western countries. Also in Southern Europe among the 1950s and 1960s cohorts second and third order births declined faster than in west European countries and the respective birth order TCFRs were therefore relatively low.

Trends in the mean ages at first birth (MAFB), for instance, confirm the above findings. At the same time these data show that childbearing continues to occur earlier in the formerly socialist countries. In the Western countries the MAFB increased from around 24 years of age in the cohorts of the 1940s to 26-28 years of age in the 1960s birth cohorts. In the formerly socialist countries the analogous increase was from around 22 years of age to 23-24.

Data on the age composition of women at first birth show that in the Western countries in the 1965 birth cohorts generally 50 to 60 percent of first births were borne by women during the first part of the reproductive period (defined as before the 27th birthday). In the formerly socialist countries these percentages were between 80 and 90. Also the proportions of second and third order births borne by young women was considerably larger in the formerly socialist countries than in the West: 50-70 vs. 30-40 percent for second order and 30-70 vs. 10-30 percent for third order births.

In virtually all countries there was a decline in the numbers of first births borne by women when they were young, i.e. during the first part of the reproductive period (attached table). The decline tended to be faster among second and third order birth, and among all birth orders in the cohorts born during the 1960s and early 1970s. These declines were an indication that there was a continuing postponement of births.

To the extent that data are available it appears that only rarely are the postponed births actually recuperated later in the reproductive period. Usually only a fraction of these births are born later.

The decline in the proportions of women having first births is meaningful taking into account that variations of intensity of first order births tend to be smaller than variations of general fertility, due to the often prevailing propensity for couples to wish to have at least one child. Further, the decline in the proportions of women having first births is meaningful because it diminishes the pool of women for higher order births.

Childbearing behavior of those women who did have the first birth can be further clarified by calculating and analyzing parity progression ratios. There is a

great deal of variation from region to region and country to country, which will be explored.

Last but not least, changes in parity distributions will be analyzed. Results of such an analysis are likely to be of major interest to policy makers and the general public. The “two child family” was the most prevalent among the cohorts of the 1950s and early 1960s, and appeared to be declining across the board. Women of parity one appeared to be on the rise, but the variations from country to country were considerable and an updated and more detailed analysis is called for.

The final version of the paper will contain detailed results, as well as estimates/alternative projections of the proportions of births that are likely to be recuperated in the near future and an attempt will be made to project parity distributions of the foreseeable future. We will also discuss the policy relevance of the empirical results.

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First birth cumulated rates (CCFRs) up to 27th birthday, 27 low fertility countries, birth cohorts 1930, 1940, 1950, 1960, 1970 and 1975 (or latest available)

Country	First birth CCFR up to 27th Birthday							Annual change between birth cohorts (percent)					
	1930	1940	1950	1960	1965	1970	1975 or latest available	1930-1940	1940-1950	1950-1960	1960-1965	1965-1970	1970-1975 (or latest available)
Nordic Region													
Denmark	…	…	0.706	0.539	0.451	0.421	0.360c	…	…	-2.7	-3.6	-1.4	-3.9
Finland	…	…	…	…	0.425	0.393	0.348	…	…	…	…	-1.5	-2.5
Norway	…	…	…	…	…	0.493	0.419	…	…	…	…	…	-3.3
Sweden	…	…	…	0.493	0.493	0.427	0.319	…	…	…	0.0	-2.9	-5.9
Western Europe													
England & Wales	0.627	0.723	0.630	0.497	0.455	0.433	0.389	1.4	-1.4	-2.4	-1.8	-1.0	-2.1
Netherlands	0.541	0.665	0.608	0.395	0.324	0.268	0.268	2.1	-0.9	-4.3	-4.0	-3.8	0.1
West Central Europe													
Austria	…	…	…	…	0.522	0.471	0.407	…	…	…	…	-2.1	-2.9
Former GDR	…	0.784	0.847	0.856	…	…	0.856d	…	0.8	0.1	…	…	…
Southern Europe													
Greece	…	0.590	0.670	0.661	0.537	0.397	0.311	…	1.3	-0.1	-4.1	-6.1	-4.9
Italy	…	0.604	0.641	0.514	0.391	0.298	0.298a	…	0.6	-2.2	-5.5	-5.5	…
Portugal	…	…	…	…	0.638	0.528	0.445	…	…	…	…	-3.8	-3.4
Spain	…	…	…	0.548	0.419	0.278	0.192	…	…	…	-5.3	-8.2	-7.4
East Central Europe													
Czech Republic	…	0.833	0.841	0.842	0.829	0.749	0.538	…	0.1	0.0	-0.3	-2.0	-6.6
Hungary	…	0.785	0.797	0.804	0.761	0.661	0.481	…	0.1	0.1	-1.1	-2.8	-6.4
Poland	…	…	…	0.772	0.726	0.672	0.546	…	…	…	-1.3	-1.5	-4.2
Slovak Republic	…	0.834	0.798	0.804	0.792	0.731	0.574	…	-0.4	0.1	-0.3	-1.6	-4.8
Eastern Europe													
Bulgaria	0.801	0.875	0.893	0.877	0.856	0.787	0.604	0.9	0.2	-0.2	-0.5	-1.7	-5.3
Romania	…	…	0.818	0.822	0.770	0.712	0.569	…	…	0.0	-1.3	-1.6	-4.5
Russia	…	…	…	0.823	0.816	0.798	0.754b	…	…	…	-0.2	-0.4	-2.8
Balkan Region													
Bosnia & Herzegovina	…	0.764	0.762	0.681	0.630	...	0.630	…	0.0	-1.1	-1.6	...	...
Croatia	…	0.776	0.782	0.782	0.702	0.554	0.491c	…	0.1	0.0	-2.2	-4.8	-3.0
Macedonia	…	0.844	0.796	0.785	0.758	0.753	0.708	…	-0.6	-0.1	-0.7	-0.2	-1.2
Slovenia	…	0.753	0.810	0.826	0.726	0.584	0.443	…	0.7	0.2	-2.6	-4.4	-5.5
Yugoslavia	…	0.830	0.835	0.767	0.715	0.675	0.578	…	0.1	-0.9	-1.4	-1.2	-3.1
Baltic Region													
Estonia	…	…	…	…	…	0.747	0.508	…	…	…	…	…	-7.7
Latvia	…	…	…	…	…	…	0.582	…	…	…	…	…	…
Non European Countries													
United States	0.780	0.793	0.649	0.577	0.563	0.557	0.557a	0.2	-2.0	-1.2	-0.5	-0.2	…

Notes: a=1970, b=1972, c=1974, d=1964