# Fertility Changes in Poland - Cohort Approach

Wioletta Grzenda
Ewa Frątczak

Fertility behaviour of women is influenced by numerous factors and is constantly changing over time, therefore fertility tables are the best tool for their analysis. Fertility tables are derived from life tables, which are one of the oldest tools of demographic analysis. The contemporary methodology of constructing life tables, based on the probability theory, was introduced by C.L. Chiang in 1968 (Chiang, 1968). He was also one of the first authors of stochastic fertility tables (Chiang, 1984). There are also numerous publication on this subject in Polish (Frątczak, 1996; Frątczak and Ptak-Chmielewska, 2011a; 2011b; Bolesławski, 1974) and foreign (Cigno, 1994; Namboodiri, 1991; Chiang and Van Den Berg, 1982; Namboodiri and Suchindran, 1987) professional literature. The basis for constructing such tables are stochastic processes, because the events from a life course of a given individual, such as for example births, can be treated as a realization of these processes. Therefore, often tables constructed in this manner are called stochastic tables. The events considered are localized in time, therefore the stochastic fertility tables can be used for analysing the changes of level and pace of this phenomenon.

The cohort approach is very common in fertility behaviour studies, because it allows the researchers to compare the fertility of each generation of women in a particular moment of their lives. One publication (Frejka and Calot, 2001), describing the fertility patterns in low fertility countries, studied woman born in the years 1930-1970. In the majority of the 27 countries analysed, the total fertility rate decreased for each subsequent birth cohorts. In order to reverse this trend, women who are at the beginning of their fertility period should adopt vastly different fertility patterns than women born in 1960s and 1970s. The analysis of fertility patterns for groups of women born in same year can be also found in many other publications (Frejka and Sardon, 2004; Sobotka, 2003).

Properly constructed fertility tables provide important information regarding women's fertility behaviour. They allow us to answer questions such as: when did a given woman give birth, at what age, and how many children does she have. Complementary character of such information is very important, therefore the professional publications offer various methods of supplementing the missing information for cohort fertility schedules (Cheng and Lin, 2010).

This article aims to analyse the fertility behaviour of women in Poland, based on the stochastic fertility tables constructed for five-year generations, from 1931-1935 to 1976-1980. The data used for constructing the fertility tables comes from "Fertility of Women" study conducted along with the National Census of Population and Housing in Poland in 2002. The basis for this study, received from Central Statistical Office, was created for the "Epidemiology of fertility dangers in Poland – multi-centre, prospective cohort study" research project by pairing the information from Form D "Women's fertility" with selected results from Form A "National Census of Population and Housing 2002" [1]. The results of descriptive fertility tables for single cohorts 1911-1986, where the birth of each child is treated as a single-episode process and not a stage process, based on the results of "Women's Fertility"

[1] Research project: Epidemiology of fertility dangers in Poland – multi-centre, prospective cohort study / Ministry of Science and Higher Education ordered grant, decision K 140/P01/2007, Repro_PL, project director: Professor Wojciech Hanke, MD, PH.D., J. Nofer Occupational Medicine Institute in Łódź. Project realization: 2007 – 2011.

Within the abovementioned project framework, the Event History and Multilevel Analysis Unit of the Institute of Statistics and Demography conducted two research assignments:

*Research Assignment 1.1.1 Demographic and socio-economic reasons for low fertility and total fertility rate in Poland (postponing the childbearing decisions – descriptive and modelling analyses). Past, present, perspectives.*

*Research assignment 1.1.2 Late fertility and childbearing diagnosis (postponing the childbearing decisions; plans and preferences – cohort prospective study (quantitative and qualitative) of demographic, socio-economic and health factors.*

*For the purpose of research assignment 1.1.1, the research team received the relevant National Census of 2002 data from the Central Statistical Office.*

study conducted along the Census of 2002, are included in the publication (Frątczak and Ptak-Chmielewska, 2011a). Moreover, the results of the preliminary analysis of this data set are contained in (Frątczak and Grzenda, 2011). This text is a continuation of research on the subject of cohort fertility based on the "Women's Fertility" study results from 2012.

The scope of the analysis conducted allows us to verify numerous research hypotheses regarding the changes of fertility behaviour of Polish women after World War II. The reasons for these changes can be linked to the Second Demographic Transition (Van de Kaa, 1987), which relates to the demographic changes from the beginning of 1990s in Central-Eastern Europe. Regarding fertility, these changes are characterized mostly by a decrease in fertility rate and postponing the decision of first birth.

Analysing the births in Poland (Bolesławski, 1974; 1975; Paradysz, 1992) we can conclude that the baby boom in 1970s and 1980s is an echo of the post-war baby boom of 1950s. Taking into consideration other publications dealing with the issue of fertility analysis we have posed two research hypotheses. The oldest birth cohorts: 1931-1935 and 1936-1940 are characterized by the largest probability of forth and subsequent births. The 1951-1955 and 1956-1960 birth cohorts exhibit a high staging probability of second and third births. At the end of the 20$^{th}$ century we have seen the lowest level of fertility in virtually every European country (Frejka and Sardon, 2004). In this study we will verify the hypothesis that the youngest birth cohorts: 1971-1975 and 1976-1980, are characterized by the greatest probability of remaining childless and the lowest rate of successive births.

The goal of this study is the analysis of fertility behaviour of women in Poland, based on stochastic fertility tables constructed for 5-year generations from 1931-1935 to 1976-1980. We used stochastic fertility tables based on staging process. The biggest changes in the values of stage probabilities can be observed in case of the last two generations: 1971-1975 and 1976-1980. They are a result of the reaction to the socio-economic and cultural transformation in Poland after 1989. These changes are accompanied by significant migration movements of women, especially those who are in their high fertility activity age. This results in a commonly encountered and described case of "Polish women more eagerly give birth on the British isles than in Poland". The results of probability estimation clearly show that in every cohort the probability of higher-order births is decreasing.

There are various opportunities for providing theoretical arguments, which can help explain the transformation changes of cohort fertility patterns in Poland. We must agree with McDonald's theory (McDonald, 2006; 2008) who argued that emergency of low fertility is associated with two waves of social change that have profound effects upon family formation behaviour in the past over 40 years. The first wave of change beginning in the 1960s was an expansion of social liberalism (so called reflective modernization) and the second wave beginning in the 1980s, was an expansion of economic deregulation, so called new capitalism, but the most important is the labour market deregulation. While in socialism period in Poland, that is up until 1989, these waves could not act with full force, for example because of government regulation of labour market, similarly to other socialist countries, their effect and importance became much more intense from the beginning of the transformation period. This translates to drastic changes in younger of the analysed cohorts: 1971-1975, 1976-1980. All theories related to the demographic changes described by the Second Demographic Transition (Van de Kaa, 1994; 1996; Lesthaeghe, 1991; 1998), that is **:** (a) the theory of increased female economic autonomy (Becker, 1991), (b) the theory of relative economic deprivation (Easterlin, 1976; 1979), and (c) the theory of ideational shift (Lesthaeghe and Surkyn, 1988; Bumpass, 1990**)** may be useful for explaining the changes in cohort fertility in Poland. They are useful also because in Poland during the transformation period the fertility and its changes were described by marital fertility – extramarital births constituted only 5% of the total number of births. This situation was subject to constant change since transformation, which is clearly visible in cohort fertility changes presented in Figures 6-7 and Figures 9-13. The intensity of changes of cohort fertility patterns was rapidly sped up along with the socio-economic transformation processes in Poland after 1989. It is worth agreeing with the opinion of Espanding-Andersen, Billari (Espanding-Andersen and Billari, 2015), who state that because of the high intensity of changes in families in post-transitional societies, the explanation of the changes using the abovementioned three theories related to the Second Demographic transition is no longer sufficient. Poland, similarly to many other transformation countries from Central and

Eastern Europe is experiencing the process of both cohort and cross-section transformation, which is determined by numerous phenomena and processes.

The changes in actual cohorts translated into the changes of cross-sectional fertility and fertility rates, which is reflected in the low values of cross-sectional fertility rates. For many years the total fertility rate in Poland is one of the lowest in the entire European Union with a value of around 1.3 children per woman. This means that there are significant changes in the nuclear family model in Poland. According to the estimation of the Polish family life tables model (Frątczak and Kozłowski, 2005), during the transformation period in Poland the model of nuclear family changed from two-child model into one-child model, with a high percentage of childless families in the general structure. The population forecast for Poland until 2050, published recently by the Central Statistical Office, is not optimistic. The forecast of total fertility rate for Poland for the years 2014-2050 will be, according to the low variant, around 1.217 to 1.375 (Central Statistical Office of Poland, 2014) – we believe this estimate to be the most realistic.