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CHANGES IN THE PROCREATIVE BEHAVIOUR IN POLAND AND SOME IMPACTS OF THE PROCESS ON THE SIZE AND AGE STRUCTURE OF POPULATION AS REVEALED BY DEMOGRAPHIC PROJECTIONS

Summary. In the 1990s, fertility was dropping rapidly in Poland. According to the GUS and the UN projections, low fertility may continue in the next decades. The procreative behaviour changes irreversibly affect the age structure of population.

If the fertility level as low as it is today continued, the number of births would be ultimately reduced by almost half compared with the present numbers. However, the structure of population would be changing gradually. First the number of the pre-school children would change and then of those at school age. The high variant of the UN World Population Prospects is the only one where the number of the children aged 0–4 years is growing to the year 2020. If fertility does not change their number will, however, drop dramatically from ca 1.8 million that we have today to below 1 million in 2050.

Decreasing fertility may distort the demographic structure in the long term by reducing the share of children and contributing to a relatively overrepresented proportion of old persons. Because of fertility falling from the 1990s and the appearance of baby boomers and baby busters, the size of the working-age population (15–64 years) will grow smaller after 2015. The aging process will also continue. The median age will grow to approx. 50 years in 2050. The dependency ratio will also increase and there will be 70 working-age persons per 100 persons aged 15–64 years, instead of slightly more than 40 that we have today.

Key words: demography, procreative behaviour, fertility, demographic forecasts.

1. Introduction

The changes in procreation that have been building up in Poland and other CEE countries since the outset of socio-economic transformation (i.e. 1990s), and in particular Western European countries since 1970s, make us ask questions about their possible consequences. The impacts of varying fertility can be forecasted by predicting the changes in the demographic structure of population. Because the human factor plays an extremely important role in all areas of economic and social

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activity, the knowledge of how the sizes of particular age groups may change allows estimating the economic and social outcomes of the impacts.

The article identifies the procreative behaviour changes, mainly those directly contributing to the formation of population structure, and compares the assumptions about future changes in procreative behaviour that underpin the particular scenarios of the UN Population Prospects (revised as of 2008) and of the GUS Population Projection spanning the years 2008–2035. However, the article mainly seeks to determine in the context of the demographic forecasts' results how the analysed changes may affect the number of population and its structure.

2. The procreative behaviour changes in Poland

Procreative behaviour is examined in terms of fertility, a fertility model and the proportion of illegitimate births. Fertility is typically understood as theoretical fertility measured by the total fertility rate indicating the number of births per woman in a given age group. Although the rate does not show the actual fertility changes (only the hypothetical ones, due to the assumption that a fertility model observed in one year will be carried out in the next years), it is used for forecasting purposes much more often than the cohort fertility rate is.

The term 'fertility model' is applied to describe the distribution of group fertility rates that indicate birth intensity by female age group. One feature of the distribution can be mother's average age at birth or the average age at giving birth to the next-order children. In particular, procreation changes under the influence of the changes in mother's age at first birth. Mother's age at any-order birth varies as a result of changing fertility and the birth structure by order.

Changes in the fertility model that do not affect the level of fertility, but arising only from variations in the age at birth, produce short-term disturbances in the age structure of population (when the female age at birth rises or drops, the theoretical fertility temporarily decreases or increases, respectively). The relationship between changing age at birth and fertility can be investigated by means of the Bongaarts-Feeney formula [Frątczak, Ptak-Chmielewska 1999]. Trying to determine how older age at birth, especially at first birth, affects the procreative potential is much more complicated. When fertility changes are analysed through public statistics (i.e. using the current birth records), we cannot find out whether fertility declines because individuals carry out their procreative decisions, or whether the situation should also be partly attributed to the loss or decrease in the couples' procreative potential. Such information can only be provided by special research.

Among the aforementioned types of procreative behaviour, the proportion of illegitimate births does not have a direct effect on population structure by sex

and age. Its indirect influence on fertility depends on whether such births take place within the existing and long-standing relationships, whether they have been planned or unplanned, whether the phenomenon is accepted by society, and on a single mother's odds of starting another relationship. Because the issue has such a variety of aspects, changes in the proportion of illegitimate births shall be omitted from this article.

3. The existing and forecasted changes in procreative behaviour in Poland according to the GUS data and the un projection

Fertility has been slowly falling in Poland since 1984. The decline accelerated in the 1990s (between 1980 and 1989 the rate of fertility dropped by 10%, and in the 1990s by 30%, see fig. 1).

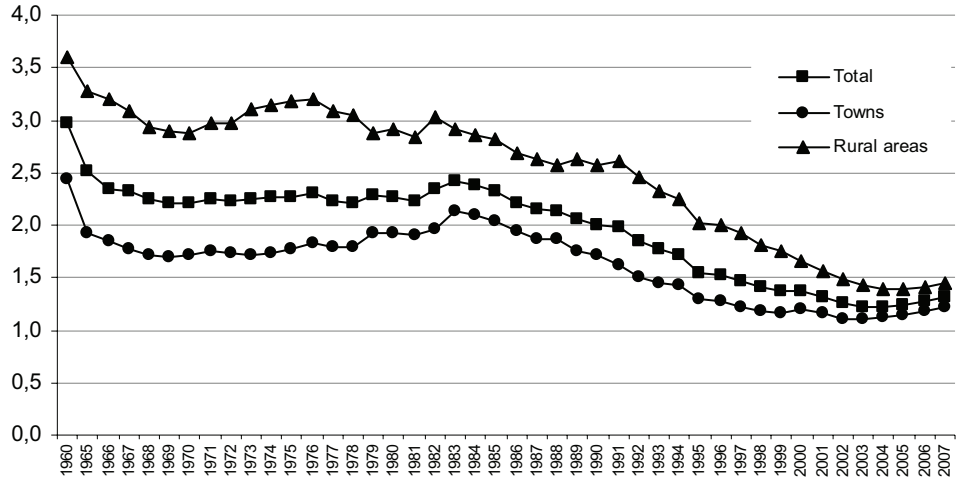

Fig. 1. Total fertility rate in Poland, years 1960–2007 by town and rural area
Source: developed by the author based on [GUS 2008a, tab. VII, pp. 58–63].

The falling fertility was accompanied by rising mother's age at birth and especially by older and older age at first birth. Such an increase may temporarily reduce the total fertility rate. That the fertility model is changing (the changes are understood as variations in the distribution of fertility rates) is particularly noticeable in the younger age groups. In the 1980s, fertility showed a similar decline in the age group 20–39 years. Since the outset of the 1990s, the largest changes in the level of fertility have been noted among females aged 20–24

years (a decrease by almost half) and those aged 25–29 years (a decrease by almost one fifth). The intensity of births in the group of females aged 20–24 years keeps falling, whereas in the age group 25–29 years the drop came to a stop. Because the females born in the wake of the post-war baby boom have carried out their postponed childbearing plans, fertility in the age groups 30–34 and 35–39 years is growing. Currently, the fertility of females aged 30–34 years is similar to that observed in the early 1980s, but the first-order births represent a high share in the group (almost 30%, see fig. 2).

The Population Projection for Poland 2008–2035 [GUS, 2008b] assumes that the rural fertility will practically remain unchanged, taking values below 1.5. In contrast, the urban fertility can be expected to rise slightly in the next years (to 1.4 in 2020). In the next quarter of a century, it will remain at a low level (below 1.5).

In the medium variant of the UN World Population Prospects [2008], fertility in Poland will also rise, but the changes will be distributed in time – the weakest growth will occur in the first decade, followed by a gradual growth in next the ten-year periods. As a result, fertility in Poland will exceed 1.6 in 2050. In the high variant, fertility will grow much higher, with the total fertility rate exceeding 1.5 already in the years 2010–2015 and then 2.0 after the year 2035. In the low variant a further, very deep fertility fall can be expected (below 1.0 to the year 2035), followed by its slight increase. The constant fertility variant assumes fertility to stay at the level of the projection's initial year (1.27) (see fig. 3). All variants predict that females' age at birth will move upwards and that the most fertile group will be that aged 25–29 years.

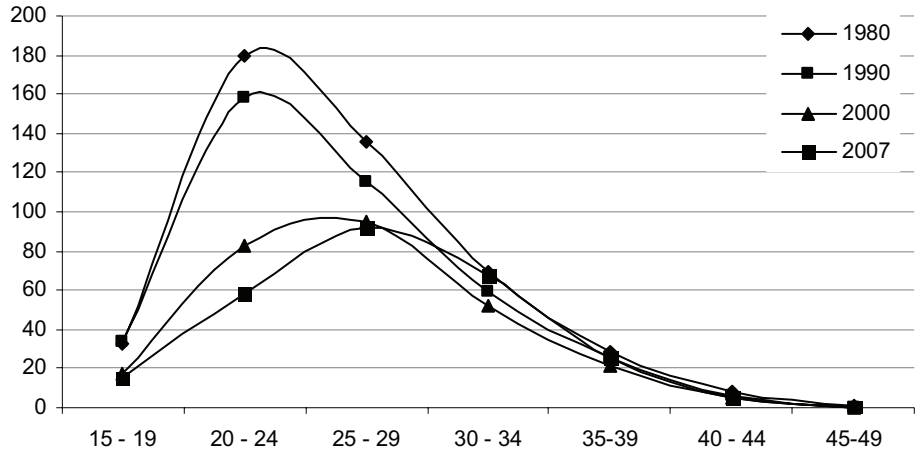

Fig. 2. The distribution of fertility rates (the intensity of births by female age group, per 1000 females in a given age group) in Poland, years 1980, 1990, 2000 and 2007

Source: developed by the author based on [GUS 2008a, tab. 75 (125), p. 301].

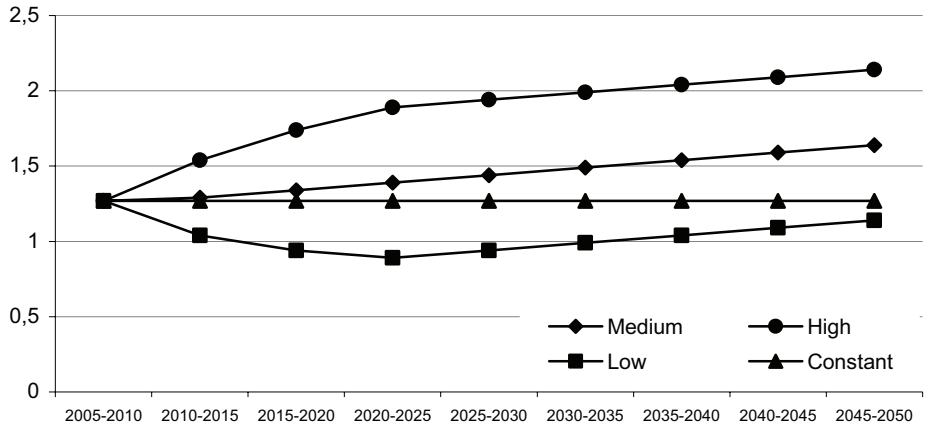

Fig. 3. The changes in the total fertility rate in Poland by variant of the UN World Population Prospects (Revision 2008)

Source: developed by the author based on [UN, 2008].

4. The selected consequences of procreative behaviour changes for the number and structure of Poland's population according to the demographic forecasts

Analysing the results of the UN forecast's variants that are founded upon different assumptions about the future course of fertility changes we can identify what demographic consequences the changing procreative behaviour may bring about, because the particular variants are built along the same mortality and migration assumptions, so the population structure can change only under the impact of changing fertility. A useful point of reference is the variant with constant fertility.

The procreative behaviour changes will primarily affect the number of births. In the particular variants of the UN World Population Prospects, the different numbers of births observed in the period of 20 years are induced by variations in procreative behaviour, and then the procreative behaviour patterns of two generations overlap each other. If the level of fertility as low as it is today survived in the long term, the number of births would decline over the next decades from slightly less than 400,000 births a year to below 200,000 at the end of the 2040s. Should the medium fertility variant be realised – which is believed to be the most probable – the number of births would be higher in the next decade (2010–2020) by 33,000 (almost 5%) vis-à-vis the constant fertility variant, growing in the next decades to 70,000, 100,000 and 150,000. If the downward trend reversed, the number of births would consequently be larger in 2050 by

almost 40%, despite relatively low fertility. In the high variant, the numbers of births are much more diversified, ranging from 200,000 in the decade 2010–2020 to 475,000 in the years 2040–2050, the latter meaning that the number of births would more than double. However, if fertility kept dropping (as in the low variant), the number of births could be smaller by 100,000–130,000 in each of the following decades (the differences would be 20–25% against the constant fertility variant, see Fig. 4).

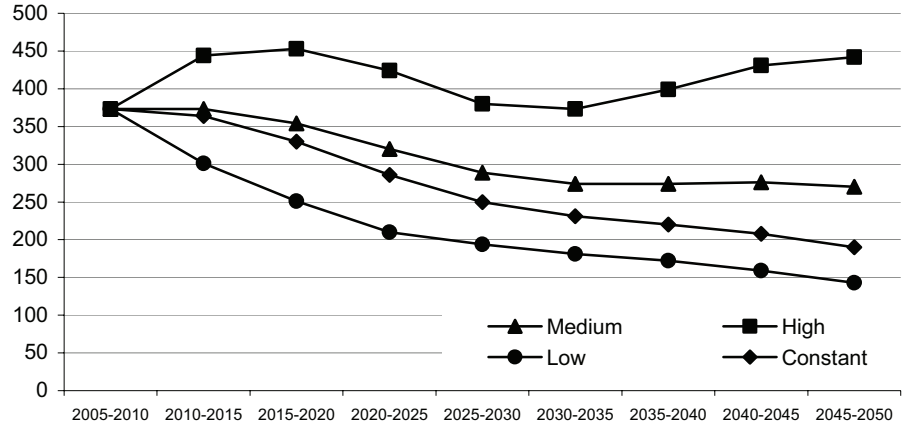

Fig. 4. The number of births in Poland (in thousands) in the years 2005–2050 by UN forecast's variant

Source: developed by the author based on [UN, 2008].

The changes in the numbers of births affect the age structure of population. First the numbers of the pre-school age children will change, and then of the school children, thus impacting the demand for tertiary education and ultimately the labour force. The population structure variations will hit the most strongly these sectors and branches that depend exclusively in the demographic factors. While labour force can be influenced by increasing the occupational activity of particular age groups, by elevating the retirement age limit, etc., the possibility of controlling the demand for obligatory schooling is limited and depends on the population age structure.

The low variant (to 2020) is the only one where the number of children aged 0–4 years will be increasing. In 2050, the number may be larger by almost one fourth than it is today. In the medium variant – which is believed to be the most realistic – the number will decrease by one fourth compared with the present

situation, but its real downslide will begin as late as the second decade of the 21st c. Under unchanging fertility, the number will drop dramatically, from today's ca. 1.8 million to below 1 million in 2050. The average rate of decline will amount to 1.4% a year.

In the next age groups, the changes will become visible together with the aging of persons born in the consecutive years. In 2050, the differences may reach as much as 100%. If the long-term fertility remained at such a low level as it is now, the number of children aged 5–14 years would drop by half (from almost 4.5 million to 2.1 million). According to the medium variant, there will be 2.7 million of them, and in the high variant their number will range from 3.6 to 4.5 million throughout the forecast period, reaching 4.1 million in 2050. In the low variant the number of children in the age group will fall to 1.6 million (see tab. 1).

Tab. 1. The number of children aged 0–4 years and their share in the total population between 2005 and 2050 by UN forecast's variant

Year	Share (%) by variant				Number (in thousands) by variant			
	Medium	High	low	constant fertility	medium	High	Low	constant fertility
2005	4.7	4.7	4.7	4.7	1777	1777	1777	1777
2010	4.9	4.9	4.9	4.9	1850	1850	1850	1850
2015	4.9	5.8	4.0	4.8	1850	2204	1493	1804
2020	4.7	5.9	3.4	4.4	1757	2252	1247	1637
2025	4.3	5.5	2.9	3.9	1589	2108	1043	1422
2030	4.0	5.0	2.8	3.5	1436	1891	963	1245
2035	3.9	4.9	2.7	3.3	1362	1855	901	1148
2040	4.0	5.3	2.7	3.3	1363	1987	856	1096
2045	4.1	5.8	2.7	3.3	1372	2145	793	1035
2050	4.2	6.0	2.5	3.1	1344	2197	710	946

Source: [UN, 2008].

Because fertility has been dropping from the 1990s and the populations born during baby booms have been aging, the number of the working age population (15–64 years) will decrease from 2015 in each forecast variant.

If the current fertility maintains, the number of persons at working age will decrease by 44%. Most probably, the age group will shrink by almost 1/3. In the high variant, the drop will be 23% and in the low variant as much as 40%. The possible effects of the discussed demographic changes on the labour market are difficult to quantify, because the resource of the economically active persons depends on the length of education, the age at withdrawal from the labour force

(to take old-age or disability pension), as well as the economic activity of men and women in particular age groups. The decreasing number of the working-age population can be offset by applying measures boosting the economic activity of the groups that have been relatively inactive so far.

A clear cut problem is the advancing aging of population. Half of Poland's population is older than 37 years of age today. By the year 2050, the median age will grow to 51 years in the medium variant; if the procreative behaviour does not change, it will be 2.3 years higher. A fertility increase assumed in the high variant level will raise the median age to 45 years, while according to the low variant it will reach as many as 56 years. The number and proportion of old persons would continue to increase. Persons older than 65 years of age account for more than 13% today, and their group is estimated at 5 million. According to the UN World Population Prospects, in 2050 there will be 9.5 million of them, and their share will vary from 26% to 34%, depending on the course of fertility changes. The dependency ratio will take higher values. There will be over 70 persons at non-working age per 100 persons aged 15–64 years, instead of slightly more than 40 that we have today. The dependency ratio will change because of the relative growth in the number of old persons. The dependency ratio may range from 46 (the high variant) to 60 (the low variant). This is more than a twofold or threefold increase compared with its present value. The different dependency ratios in the variants will become noticeable after the year 2035 (tab. 2).

Tab. 2. The ratio of the working age population (15–64 years) and the retirement age population in the years 2005–2050 by UN forecast's variant

Year	Variant			
	medium	high	low	constant fertility
2005	19	19	19	19
2010	19	19	19	19
2015	22	22	22	22
2020	27	27	27	27
2025	32	32	32	32
2030	35	34	35	35
2035	36	34	37	36
2040	39	36	41	39
2045	44	41	49	45
2050	52	46	60	54

Source: [UN, 2008].

5. Conclusion

The procreative behaviour changes, both observed and forecasted, especially as dynamic as those that have been occurring in Poland over the last two decades, affect the age and sex structure of the population. In Poland, because of the appearance of baby booms and baby busts (resulting from the post-war compensation for lower number of births), the consequences of changed procreative behaviour patterns may be additionally amplified or weakened by the structural factor. In the long term, however, fertility decline will distort the demographic structure by reducing the proportion of children and increasing the relative share of old persons (see Fig. 5).

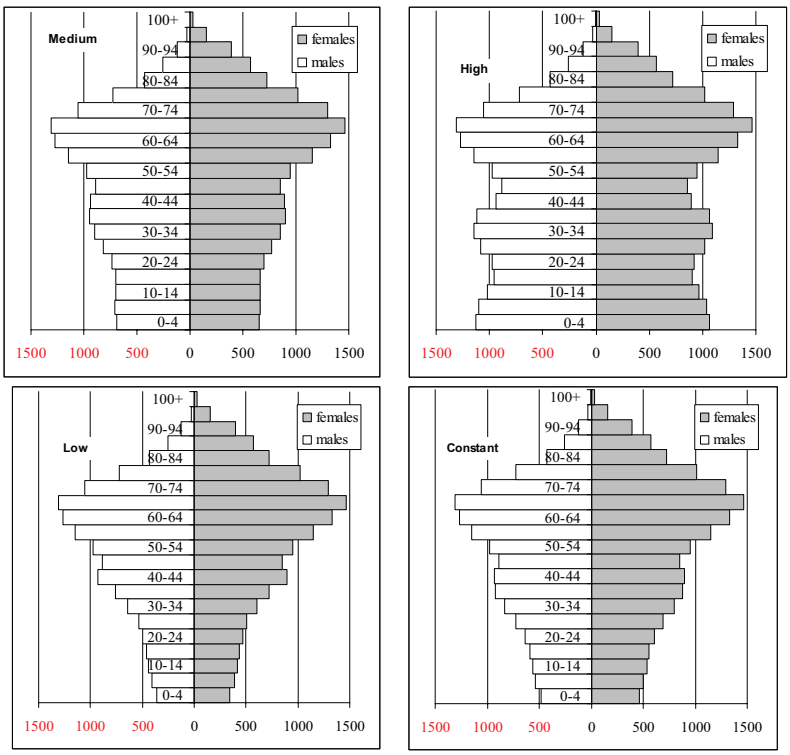

Fig. 5. Population structure as of 2050 by UN forecast's variant

Source: developed by the author based on [UN, 2008].

First the numbers of births will change, then the numbers of the youngest children, schoolchildren, etc. The dynamically dropping fertility that has been observed since 1990s will reduce the potential labour force only in the next dec-

ades. The knowledge of the possible impacts of particular demographic trends should help prepare the economy, or its selected sectors, to the forthcoming changes, while encouraging the use of instruments that could reduce the potentially negative impacts of the changes in procreative behaviour.

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