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Analysis of the Natural Movement of Population Within Bacau County – Birth Rate

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Abstract: *The paper is an analysis of phenomena of birth and fertility in Bacau in the last 10 years. Based on the Romanian National Statistics Institute data, the analysis traces the evolution of these phenomena backgrounds, genders, age groups and the causes of this evolution. It provides a comparison with the situation in the country. The paper also examines the relationship between economic growth and population growth.*

The transition of birth rate and fertility, as component parts of the demographic transition process, reflects the changes that took place after 1989 within the political system, in economy, in social life and in people's mentality, with influences upon the demographic behaviour of the population.

Keywords: *birth, born-alive, fertility*

Introduction

Increased mortality, the spread of birth control, the accelerated process of population aging, the changing of traditional values on fertility, marriage, divorce are all issues that are currently facing our country demographics.

The natural movement of population has an important role in analysing demographic phenomena. Components demographic phenomena (birth, death, marriage rate and divorce) are influenced with time passing by several social-economic factors and also some biological ones.

On the background of the economic and social crisis faced by Romanian society after 1989 we are also witnessing the demographic transition; it is the process by which people move from old demographic regime, which have a high birth rate, to the contemporary demographic regime, this phenomenon is decreasing. In Romania, in recent years, the demographic situation worsened; the trend is declining birth-rate and mortality marked an increase.

Birth and fertility play an important role in modifying the number and structure of population from one period to another. In what follows we shall analyse these phenomena in Bacau for the period 2005-2014.

1. Birth. Rate of Birth

According to the Dictionary of the Romanian Language, the birth rate is a *result of the reporting indicating new-borns per thousand inhabitants living in a certain period of time and indicating the frequency of births in a given population.* [2, 669]

The National Institute of Statistics defines the birth rate as *the number of born alive in a calendar year, per 1000 inhabitants, on 1 July of that year.* [3, 43]

The born-alive is a product of conception completely ejected or extracted from the mother's body, independent of pregnancy and who, after that separation, shows signs of life (breathing, heart activity, beats of umbilical cord or muscle contractions dependent of the will. [3, 43]

The analysis of the birth evolution in our country between 2005-2014 (data in Table no. 1 and Figure no. 1) highlights the small fluctuations of its rise and fall, reaching a maximum of 9.9 births per 1,000 inhabitants in 2009 and 8.3 births per 1,000 inhabitants in 2014 (provisional data).

The same trend is emphasized by specific dates of Bacau County, the trend being a downward one, but with little movement in the + or - from year to year. The highest value recorded in 2006, is of 10.7 ‰ and the lowest in 2014, is of 8 ‰. Importance in analysis is also the sharp and significant decline in birth rate in 2014 compared to 2013, both at the country level and at the county level.

Table no. 1 The rate of birth within Bacau County compared to the one registered in the country during 2005-2014

Born alive reported to the 1,000 inhabitants

	Years									
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Romania	9.8	9.7	9.5	9.8	9.9	9.4	8.7	9.0	9.3	8.3
Bacau county	10.4	10.7	10.6	10.4	9.9	9.7	9.1	9.3	9.6	8

Source: The National Institute of Statistics, 2005-2014, Tempo-Online

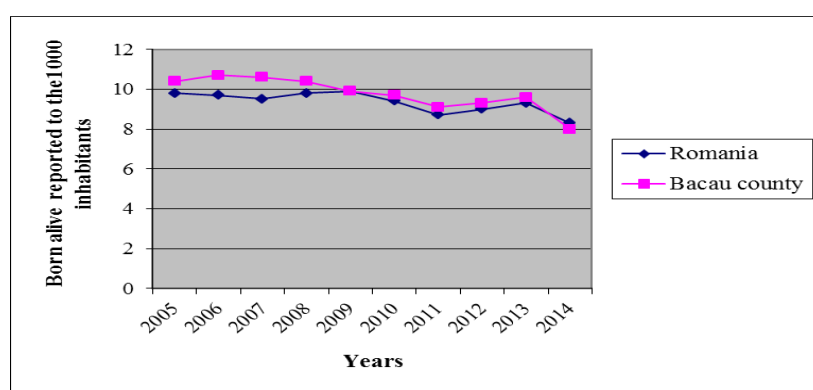


Figure no. 1 Birth rate evolution during 2005-2014

Declining birth rates over time was determined by a number of factors, such as woman's empowerment and her participation of the economic growth activities outside home, the intensified migration, the reducing of the influence of cultural norms, the increase of social mobility, the increase of expenditures for children growth and education, the uncertainty and stress.

Table no. 2 Born alive in Bacau County according to gender

Gender	Years									
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Number of persons										
Total	7,925	8,141	8,067	7,880	7,542	7,305	6,858	6,981	7,184	5,998
Male	4,123	4,202	4,142	3,967	3,885	3,715	3,541	3,609	3,615	3,062
Female	3,802	3,939	3,925	3,913	3,657	3,590	3,317	3,372	3,569	2,936
%										
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Male	52.03	51.62	51.34	50.34	51.51	50.86	51.63	51.70	50.32	51.05
Female	47.97	48.38	48.66	49.66	48.49	49.14	48.37	48.30	49.68	48.95

Source: data analysis from the Romania National Institute of Statistics, 2005-2014, Tempo-Online

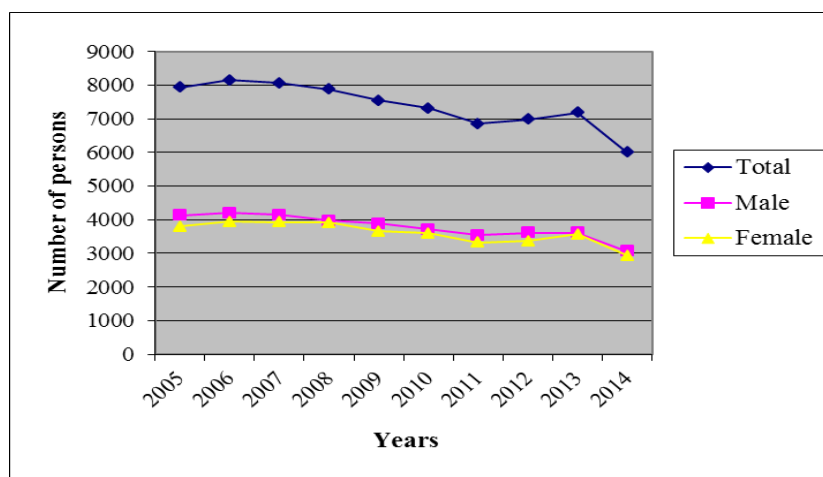


Figure no. 2 The evolution of the born-alive during 2005-2014 according to their gender

The analysis of the data from Table no. 2, regarding the number of born alive according the gender, reveals that male living births (52.03% in 2005) ahead the female living births (47.97%). At the end of the period, the situation is maintained, but it is reduced the proportion of male ones compared to reference year (51.05% in 2014) and it increases the percentage of female new-borns (48.95%).

Table no. 3 Born alive in Bacau County according to social backgrounds in Bacau County

Residence environments	Years									
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Number of persons										
Total	7.925	8.141	8.067	7.880	7.542	7.305	6.858	6.981	7.184	5.998
Urban	3.399	3.612	3.584	3.531	3.291	3.284	2.969	2.965	3.067	2.477
Rural	4.526	4.529	4.483	4.349	4.251	4.021	3.889	4.016	4.117	3.521
%										
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Urban	42.89	44.37	44.43	44.81	43.64	44.96	43.29	42.47	42.69	41.30
Rural	57.11	55.63	55.57	55.19	56.36	55.04	56.71	57.53	57.31	58.70

Source: data analysis from the Romania National Institute of Statistics, 2005-2014, Tempo-Online

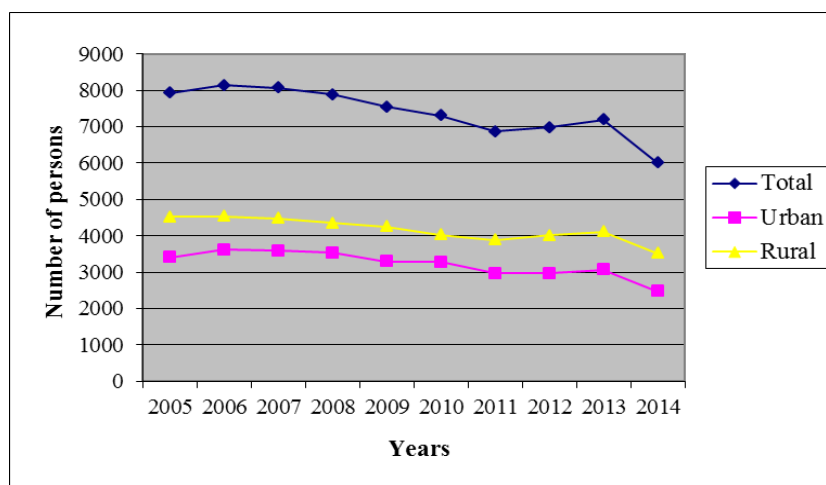


Figure no. 3 The evolution of born alive during 2005-2014 according to the environment background

Table no. 4 Birth rate in Bacau County according to social environment

Born alive reported to 1,000 inhabitants

Residence environment	Years									
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Total	10.4	10.7	10.6	10.4	9.9	9.7	9.1	9.3	9.6	8
Urban	9.2	9.9	9.8	9.8	9.1	9.1	8.3	8.4	8.7	7
Rural	11.5	11.5	11.3	10.9	10.7	10.1	9.8	10.1	10.4	8.9

Source: The Romanian National Institute of Statistics, 2005-2014, Tempo-Online

Analysis by residence (Tables 3 and 4) reveals that the birth rate was lower in urban areas (9.2 ‰ in 2005) compared to rural areas (11.5 ‰ in 2005) and falling for both social environments for the whole period 2005-2014 (7 ‰ in urban and rural areas respectively 8.9 ‰ in the rural one in 2014).

In urban areas there is a lower proportion of families with many children, a large number of couples limiting to one child or two in most situations.

The gap between the birth rates of those two residence environments is based on structural differences in the age of the population and the percentage of the female population of childbearing age between urban and rural, level of education, tradition, the work of women in the household or outside the household and the internal migration of the two media.

Table no. 5 Born alive according the father's age group

Number of persons

Father's age group	Years									
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Total	7.925	8.141	8.067	7.880	7.542	7.305	6.858	6.981	7.184	5.998
under 15 years	-	-	-	-	-	-	2	-	-	-
15-19 years	106	108	123	132	118	103	88	85	90	78
20-24 years	894	845	806	816	823	853	818	779	721	586
25-29 years	2.411	2.447	2.387	2.307	1.975	1.785	1.639	1.664	1.704	1.450
30-34 years	2.142	2.224	2.333	2.211	2.245	2.163	1.986	2.070	2.053	1.577
35-39 years	1.170	1.261	1.248	1.204	1.163	1.166	1.132	1.175	1.288	1.187
40-44 years	378	374	354	416	445	470	469	481	531	414
45-49 years	145	141	135	152	142	130	117	111	158	132
50-54 years	31	37	39	33	38	57	49	32	44	21
55-59 years	9	15	9	12	15	13	9	16	12	16
60-64 years	2	3	5	2	6	7	4	4	-	5
65 years and over	-	2	2	2	3	1	1	1	1	1
Non-declared	637	684	626	593	569	557	544	563	582	531

Source: The Romanian National Institute of Statistics, 2005-2014, Tempo-Online

Analysis of live births by age group according the father (table no. 5) gives the best represented groups as the following: 30-34 years old, 25-29 and 35-39. In the year 2014 the three groups accounted for 70.25% of total, decreasing by 1.73% compared to their share in 2005.

If we analyse the evolution over time, those 10 years, emphasizes a more significant fall in the age group 25-29 years old (60.14% versus 75.68% in total).

In terms of distribution of live births by age group according the mother (Table no. 6) it is observed that the most numerous are those born to mothers aged 25-29 years, followed by those born to mothers between 20 and 24 years. An important share it is also gaining the age group of 30-34 years. This distribution reflects the influence of reproductive model of Western European countries formed since the 70s namely couples want a small number of children brought into the world at an older age and in more and more higher proportion by single mothers, a model that has become more widespread in Romania after 1989.

Table no. 6 Born alive according to the mother's age group

Number of persons

Mother's age group	Years									
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Total	7.925	8.141	8.067	7.880	7.542	7.305	6.858	6.981	7.184	5.998
under 15 years	28	30	.20	33	21	34	33	36	29	44
15-19 years	987	998	1.002	994	960	835	810	784	740	701
20-24 years	2.149	2.083	1.970	2.022	1.944	1.917	1.799	1.815	1.798	1.373
25-29 years	2.579	2.675	2.701	2.418	2.199	2.039	1.902	1.930	2.061	1.792
30-34 years	1.504	1.594	1.606	1.639	1.646	1.729	1.547	1.597	1.618	1.279
35-39 years	593	675	658	644	629	610	633	677	783	676
40-44 years	81	82	105	127	140	134	130	140	152	126
45-49 years	4	4	4	3	3	7	4	2	3	7
50 years and over	-	-	1	-	-	-	-	-	-	-

(Source: The Romanian National Institute of Statistics, 2005-2014, Tempo-Online)

To increase the birth-rate, the government should initiate action plans to help the couples to have children who want them, which relate to: kindergarten with extended that would allow women to work; setting up kindergartens and nurseries by the employer to give parents the option to be close to children; a flexible working to increase the time that young parents gave it to family and home. Other measures that could lead to increased birth rates are better conditions of life, in particular to facilitate access to the labour market; rural development programs; increasing access and quality of reproductive health, including family planning.

2. Fertility

Between fertility and birth there is a direct intensity causing fertility birth rate. The evolution of fertility is affected, in addition to the demographic and behavioural factors of some changes in the number and structure of fertile female contingent.

The fertility rate is an indicator that measures the frequency of live births compared with the number of women of childbearing age (15-49 years) over a period of time, usually one year. It is calculated for the entire contingent fertile, and for five-year age groups. [3, 43]

As in the case of birth, fertility has as characteristic the downward trend in the period 2005-2014, both in the country and in Bacau County (Table no. 7).

Although in 2005 the fertility rate in Bacau County was higher than at the country level (39.8 ‰ to 37.3 ‰ compared to Bacau at the country level), at the end, it is below the level at national (31.4 ‰ compared to 33 ‰ in Bacau at the country level).

Table no. 7 The fertility rate in Bacau County compared to the one registered in the country during 2005-2014

Born alive reported to 1,000 women of fertile age

	Years									
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Romania	37.3	37.3	36.8	38.5	38.7	37.2	34.6	35.6	36.9	33.0
Bacau county	39.8	41.2	41.1	40.5	39.0	37.9	35.8	36.6	37.7	31.4

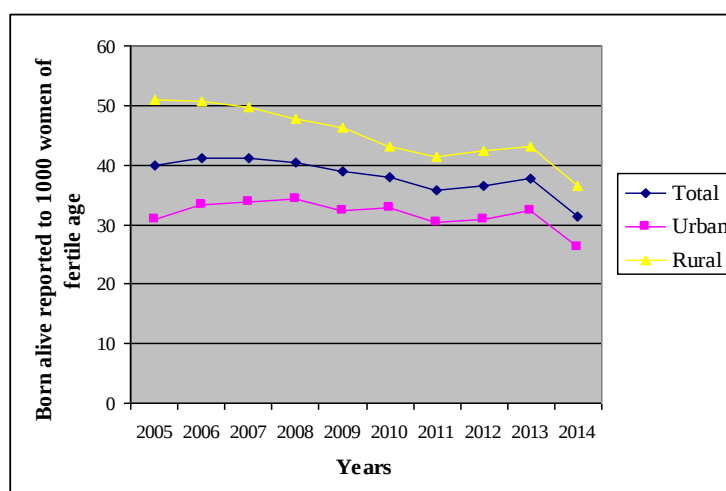
Source: The Romanian National Institute of Statistics, 2005-2014, Tempo-Online

Table no. 8 The rate of fertility in Bacau County according to social environments

Born alive reported to 1,000 women of fertile age

Residence environments	Years									
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Total	39.8	41.2	41.1	40.5	39	37.9	35.8	36.6	37.7	31.4
Urban	30.9	33.4	33.8	34.2	32.4	32.9	30.4	30.9	32.3	26.3
Rural	51	50.6	49.7	47.8	46.2	43.2	41.5	42.4	43.1	36.4

Source: The Romanian National Institute of Statistics, 2005-2014, Tempo-Online

**Figure no. 4 The evolution of the number of live births reported to 1000 women of fertile age during 2005-2014 according to residence environments in Bacau County**

Fertility is also higher in rural than urban areas, as in the case of birth (Table no. 8 and Figure 4). Thus, in 2005 the fertility rate in rural areas was 51 ‰ to 30.9 ‰ in urban areas by the end of the reporting period, being 36.4 ‰ compared with 26.3 ‰ in urban areas.

The factors of the decrease in fertility, since 1991, are none others than those already registered in the 60s and 70s, having triggered massive kickback in fertility in almost all developed European countries [1]. Thus, the factors before the fertility decline in Romania and implicitly in Bacau are:

- declining share of traditional agricultural households characterized by high fertility, necessary for productive activity, but also to ensure the safety of older people;
- increasing social mobility;
- empowerment of women, access to education at all levels and participation in non-agricultural activities;
- increased demands of parents relative to raising and educating children, requiring additional time and expense;
- extending social security to reduce children's role in supporting parents in old age (the public pension system, elderly care institutions dependent);
- emergence of modern contraceptive;
- factors related to religion, culture, demographic policy.

All these factors influence the demographic behaviour and vital demographic events - birth, death, marriage and divorce, migration. What is the age at first marriage? How is the selection of the intending spouses? What is the attitude towards the family, what are the attached values to family? What is the desired number (projected) of children in the family? What is the timing of their birth? What are the motives in each case?

Increasing fertility can only be achieved by means that will change the framework where people live, by demographic policies, through a policy of stimulating nature, respecting the right to individual or couple's own decision, information and access to modern contraceptives.

Sociological studies show that improving the economic situation does not lead, in itself, a change in demography and social policies aimed at reducing disparities, eradicating pockets of poverty, helping those most in need would have at most a minor impact and sporadic fertility and are insufficient to reverse the fertility trend of the last two decades.

Table no. 9 The rate of fertility in Bacau County according to mother's age group

Born alive reported to 1,000 women of fertile age

Mother's age group	Years									
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Total	39.8	41.2	41.1	40.5	39	37.9	35.8	36.6	37.7	31.4
15-19 years	31.9	33.1	35	37	37.8	35.7	35.8	36	34.3	32.6
20-24 years	75.4	74.8	69.8	69.2	65.3	63.7	61.4	65.1	68.6	55.3
25-29 years	81.4	84.9	87.7	82.3	78.2	74.2	71.5	71.5	73.8	62.6
30-34 years	51.7	54.3	53.7	53.6	53.2	55.9	50.4	52.9	56.3	46.4
35-39 years	19.3	20.8	19.7	21.4	21.8	21.3	21.9	23	25.9	22.1
40-44 years	3.8	4	5.1	5	5	4.4	4.1	4.2	5.1	4.4
45-49 years	0.2	0.2	0.2	0.1	0.1	0.3	0.2	0.1	0.1	0.3

Source: The Romanian National Institute of Statistics, 2005-2014, *Tempo-Online*

Analysing the data in Table 9 one can see that during 2005 to 2014, the fertility rate is highest in the mother's age group of 25-29 (lowering from 81.4 ‰ in 2005 to 62.6 ‰ in 2014, the largest value of 87.7 ‰ being reached in 2007), followed by the group of 20 to 24 years (lowering from 75.4 ‰ in 2005 to 55.3 ‰ in 2014). The lowest rate was recorded in the age group of 45-49 years (0.2 ‰ in 2005, 0.3 ‰ in 2014).

3. The Economic Growth – the Demographic Growth

Unlike previous models, where the population was considered an exogenous variable, current models of economic growth considered population an endogenous variable, taking into account a larger number of demographic variables. It has been realized thus a multifactorial analysis of the relation population - economic and social development, being able to perform even the anticipation of a future development of population based on trends of economic growth.

Thomas Maltus is one of the first theorists who studied the relationship between population and economic growth. According to Malthus's theory (theory known as *Malthusianism*), population increases in geometrical progression, while livelihoods grow in arithmetic progression. As a consequence of this relation population - economic status, Malthus considers that poverty, diseases, epidemics and wars are positive factors to mankind, given the fact that there is ensured a balance between population and livelihoods amount [2]. The arguments of Malthusian theory and of the neo-Malthusian literature, where rapid population growth impedes economic development, consider the following [4]:

- Population growth determines increased pressure on scarce natural resources; in agriculture, in particular, resulted in a decrease in the average area of arable land per worker and enforcement of decreasing returns;
- Maintaining a high fertility forces the majority of the adult population to devote time and effort to raising children; production activities outside the home are greatly reduced, especially among women;
- Increase investments needed to ensure new residents the same standard of living (i.e., investments demographics) will have the effect of jeopardizing the potential for capital formation productive private and public, affecting the progress of productivity (instead, a reduction in fertility frees resources for the accumulation of capital).

Economic development tends to result in a period more or less long, a reduction in the gross birth rate, higher than the crude death rate (the third phase of transition¹) resulting in a slowdown in population growth.

¹ Demographic transition model, introduced in 1945 by Frank Notestein

It can be said that the state of the economy and the population is in the inter-relationship.

What is the impact of growth on population growth?

Economic growth can, in various ways, to stimulate population growth by increasing birth rate (regression of certain types of infertility, decreased intrauterine mortality, etc.); by encouraging immigration (in turn stimulating economic growth, immigration contributes to strengthening the correlation required); by reducing mortality etc.

The positive effect of improving health is really fundamental, both through the direct impact thereof (the gradual disappearance of economic losses associated with premature mortality, reducing action to destabilize the illness and death on the family, increased ability psychophysiological at work) and indirectly through its impact on socio-economic changes. There is a strong link between access to greater prosperity and improve the health of the population: both of them maintained in each other, putting the game very complex mechanism (such income growth allows better nutrition and better training, it in turn can boost both income growth and population). This argument carries more weight than the decrease in mortality, being the driving engine in the growth of modern population.

How population growth affects economic growth?

In favourable circumstances industrialization can make from population growth a valuable incentive to increase the standard of living, both by providing the necessary workforce for exploitation of natural resources, markets and extending necessary for the absorption and mass production more profitable.

In other words, population growth may affect the demand and supply businesses. Thus, the increase in population results in an increase of needs and consumption. This extension of needs helps to increase the productive effort by mobilizing labour and resources by transforming underutilized and farming methods (use of fertilizers, irrigation, mechanization, practicing multiple cultures).

The changes of the labour supply are two mechanisms that generate productivity gains.

- Geographical and sectorial migration, caused by demographic pressure in rural areas (agricultural working population transfer with low productivity to high productivity sectors with). Non-agricultural population growth can also lead to rising food prices that can reduce stiffness agricultural supply and increasing pressure on wage costs, can facilitate the adoption of production strategy based on high labour productivity.

- Replacing the generations of illiterate or semi-literate workers by new generations better prepared, more open to modernity. This process is the more powerful as education progresses have been higher in recent decades; slowly, imperceptibly as any structural phenomenon, it can be decisive in the long term.

Conclusions

Romania and Bacau County is characterized by low birth rates and fertility which, combined with higher mortality rates, leads to a negative growth of population. The result is an aging population, affecting the economic and social development. It is therefore necessary to define a strategy for sustainable development the cornerstone of which is population.

The analysis birth and fertility in Bacau in the period 2005 - 2014 revealed the following: downward curve birth and fertility rates; situating rates above the country level (except in 2014); birth and fertility higher in rural than urban areas; male live births are more than those of the female births; it predominates births in women aged between 25 and 29 years.

To encourage higher birth rates pro-birth policies are needed whose success depends on the extent to which they will be able to counteract the factors that contributed to the significant decline in birth and fertility.

The number of children that a woman or a couple decides to have is a result of a complex combination of factors, including the cost of bringing up children, opportunities for women to get a higher education and a professional position as good, household economic status, marital status (including divorce and cohabitation), and degree of compatibility of work with child care.

Sociological studies show that improving the economic situation does not lead, in itself, a change in demography and social policies aimed at reducing disparities, poverty eradication, helping those most in need would have at most a minor impact and sporadically on fertility and they are insufficient to rebut the fertility trend of the last two decades.

References

- [1] Ghețău, V., (2001), *Populația României la sfârșit de secol și mileniu. Ce perspective?*, Populație & Societate, No.1, No.2
- [2] Academia Română, Institutul de lingvistică “Iorgu Iordan”, (1998), *Dicționarul explicativ al limbii române*, Second edition, Univers Enciclopedic Publishing House, Bucharest
- [3] Institutul Național de Statistică, Direcția Județeană de Statistică Bacău, *Anuarul Statistic al Județului Bacău*, 2013 Edition
- [4] <http://www.melchior.fr/les-relations-entre-croissance.2292.0.html>, accessed on February 5th 2016

Supplementary recommended readings

- Malthus, R., (1992), (translate by Victor Vasileoiu and Elena Angelescu), *Eseu asupra principiului populației*, Scientific Publishing House, Bucharest
- <http://statistici.insse.ro>, accessed on February 2016