

CHANGES IN DEMOGRAPHIC BEHAVIOR OF SUCEAVA COUNTY POPULATION IN NATIONAL CONTEXT

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Abstract:

The population is one of the most complex statistical groups in terms of the variety of the recorded characteristics, of the changes affecting it and of its structure, as well as in terms of the inter-conditioning relationships between the demographic and the social-economic phenomena. The demographic problems triggered by the declining fertility in EU countries can also be identified in Romania as well, but the rather precarious state of the Romanian economy will most likely lead to a more serious social impact in the following years. The population of Romania has undergone significant changes in the past few decades, due, on the one hand, to the demographic transition it is undergoing and, on the other hand, to the changes affecting the political, economic and social environment, as well as people's mentalities, and influencing the demographic phenomena dynamics. The negative values of the natural growth rate and of the migration balance has caused the constant population of Romania to decline during 1992-2011 by almost 2.7 million inhabitants. The changes in the demographic behaviour of the population in terms of the average number of wanted children per family, the rather high external migration rate as well as the increased mortality rate are the demographic characteristics of Romania. The purpose of this research is to analyse the population of Suceava county by time series, in order to identify changes in the demographic behaviour compared to what was recorded nationwide.

Key words: demographic behaviour, structure, characteristics, fertility, population.

JEL classification: J11, C15, C40

1. INTRODUCTION

In order to reach our goal with the present research, we have established a series of objectives:

1. Highlighting the factors affecting the number and the structure of the population, as well as the existing theories in the professional literature as concerns the population;
2. Analysing the changes in the number and structure of the population in Suceava county;
3. Comparing the level and the development of the main demographic phenomena in Suceava county with the overall situation in Romania in order to identify any existing differences or similarities;

In most cases, the declining population in the area is mostly due to a constant excess of the number of deaths in relation to the number of births, accompanied by the negative balance of the internal and the external migration.

The birth rates recorded in the counties in the historic province of Moldova have always been above the average recorded on a national level, thus giving it the name of “population basin”. Suceava county is one of the counties that have traditionally had a natural growth but one that had been overcome with internal and external migration rates in the past few years (Ghețău, 2012, p. 13).

An important aspect of the analysis is the study of birth seasonality of this demographic phenomenon. To eliminate even partial random factors action is recommended that analysis be made to reflect the number of live births per months, a period of 3-5 consecutive years (Sora & Mihăescu, 2010, p. 135).

2. ANALYSIS OF THE SEASONALITY BIRTH OF THE SUCEAVA COUNTY POPULATION

In order to characterize the seasonality of births in the county of Suceava, were considered the number of live births per month of the year in 2007-2012 (table no1).

Table no 1. The number of live births per month in the period 2007-2012

Month		Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Years	2007	738	667	646	647	709	710	763	733	766	703	608	623	8313
	2008	714	662	668	661	704	717	852	748	779	757	658	634	8554
	2009	677	582	692	644	714	780	798	708	749	711	609	597	8261
	2010	676	591	672	644	711	687	702	687	746	690	611	584	8001
	2011	688	584	636	614	628	690	778	734	716	632	613	563	7876
	2012	673	623	690	657	734	719	737	703	784	681	602	586	8189

Source: Statistical monthly bulletin county, INS, 2007-2013

Note: The number of live births was partitioned after mother's home

The graphical representation of the number of live births per month in the period 2007-2012 is provided by waveforms in Figure no1.

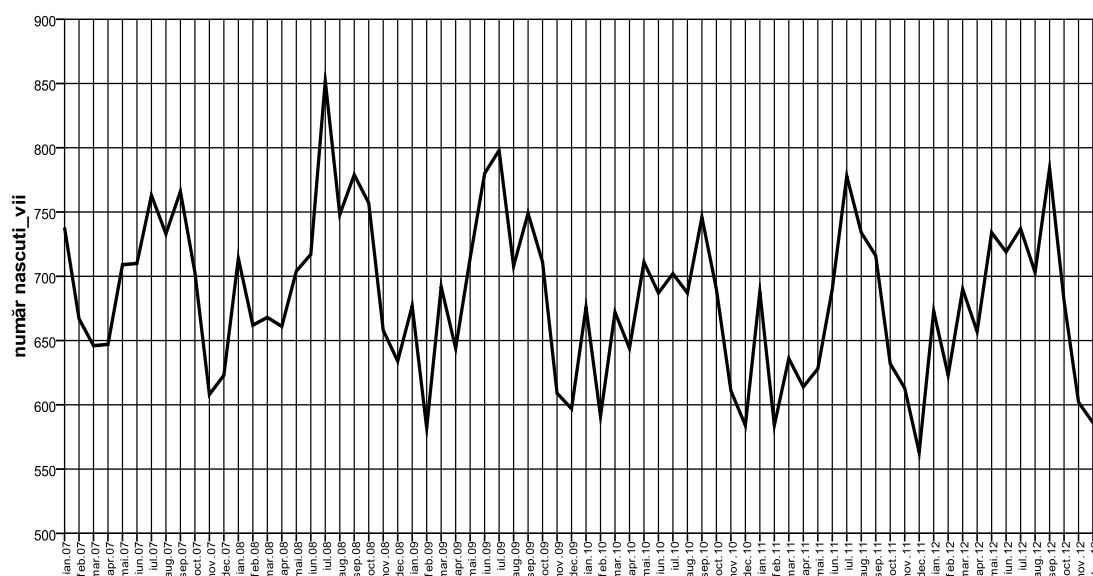


Figure no.1. Evolution of the number of live births in the county of Suceava, by months, the period 2007-2012

Based on the graphic representation of the evolution monthly number of live births in the period 2007-2012, we find that most births took place in the months: July, August and September.

Statistical analysis of seasonality aims to measure seasonal variation, identifying the causes of seasonality and establishing social consequences. In this regard, we calculated monthly seasonality indices to indicate the point of maximum and minimum intensity of birth and the periods of growth and decline of its.

The methods used to calculate coefficients of seasonality are diverse but frequently resort to arithmetic average method. Under this method, seasonality indices are calculated using the formula:

$$I_s = \frac{\bar{y}_l}{\bar{y}} \cdot 100$$

in which:

$\bar{y}_i$ - monthly average

$\bar{y}$ - average monthly general

The values of these coefficients approaching 100, the attenuated seasonal and conversely, the 100 is removed, the seasonality of birth is more pronounced.

If applied directly arithmetic method, then it will first calculate how many arithmetic average for each month, covering the period of the 6 consecutive years, then a monthly average overall. Determining the overall monthly average as either an arithmetic mean of monthly averages, or by summing all terms of the time series and dividing by the number of terms of the series (72 terms).

Through specific reporting of average monthly average each month in general resulted seasonality indices that characterize the average deviation of each month towards defining the monthly average for the whole period of 6 years.

Table no 2. Average monthly and seasonality indices for the number of live births in the period 2007-2012

Luna	Ian.	Feb.	Mar.	Apr.	Mai	Iun.	Iul	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Monthly average	694	618	667	645	700	717	772	719	757	696	617	598	683
Seasonality indices (%)	101,6	90,5	97,7	94,3	102,5	105,0	112,9	105,2	110,8	101,8	90,3	87,5	101,6

Based on the results summarized in Table no. 2. it can be seen that in the period 2007-2012, most births (772 births) were recorded on average in July, while the fewest were in December of 598 live births. The monthly average mark obtained for this period was 683 live births.

If in January, the number of live births is on average 101.6% of the average monthly general in December the average number of live births was only 87.5% from the average monthly general. July was the peak recorded number of births averaging 12.9% over the monthly average overall.

After calculating the seasonality indices can say that the birth rate has a seasonal development. In the first four months of the year, the number of live births has fluctuated since May, following a period of 6 months the number of births increases, and in the last two months recorded declines.

In order to characterize the intensity and trend seasonality factor was applied Struck concentration (Cs), using the relationship:

$$C_s = \sqrt{\frac{n \sum g_i^2 - 1}{n - 1}}$$

This concentration ratio can have values in the range [0, 1]. The minimum amount possible ($C_s = 0$) is independent of the categories considered, which gives coefficient comparable advantage of facile interpretations. A value of 1 is reached when the concentration is at a maximum, and the value 0 when there is a uniform distribution (Jaba E., 2002, p. 198).

The calculations necessary to determine the concentration ratio for 2007-2012 were carried out in Appendix.

Concentration ratios for each of the years 2007-2012 are calculated below:

$$C_{s(2007)} = \sqrt{\frac{12 \cdot 0,083791 - 1}{12 - 1}} = 0,022343$$

$$C_{s(2008)} = \sqrt{\frac{12 \cdot 0,083928 - 1}{12 - 1}} = 0,025476$$

$$C_s(2009) = \sqrt{\frac{12 \cdot 0,08412 - 1}{12 - 1}} = 0,029304$$

$$C_s(2010) = \sqrt{\frac{12 \cdot 0,083758 - 1}{12 - 1}} = 0,021516$$

$$C_s(2011) = \sqrt{\frac{12 \cdot 0,084074 - 1}{12 - 1}} = 0,028428$$

$$C_s(2012) = \sqrt{\frac{12 \cdot 0,083897 - 1}{12 - 1}} = 0,024801$$

Concentration values for the coefficients of monthly distribution shows a relatively uniform, the number of live births during each year.

To get a picture of the evolution of the concentration of the number of live births in the period 2007-2012, concentration ratios obtained were expressed as percentages and graphically represented as columns with a height equal to the percentage coefficient of concentration. The graph in Figure no.2 shows an alternation of periods of growth and decline in the level of concentration.

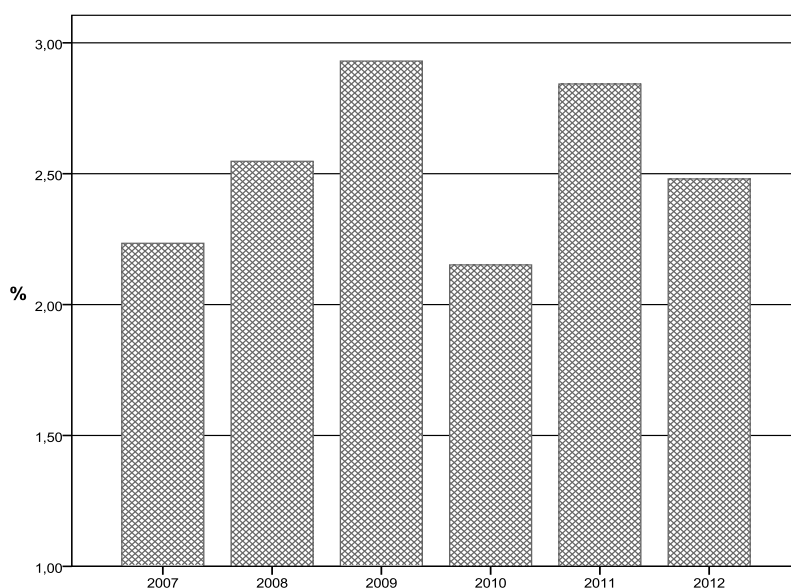


Figure no.2. Evolution of the seasonal concentration of birth

Changing demographic behavior can be seen by reducing the average number of children per family. So, after 1989, the fertility decline was related to the reduction in the number of live births of all ranks, and in particular those senior (III and above).

3. CONCLUSIONS

An important aspect in the analysis of the birth rates was the study of the seasonality of this demographic phenomenon. In order to define seasonality in the population birth rates we have considered the number of live births per months of the year during 2007-2012. The conducted analysis has revealed that most births have occurred in July, August and September. The general monthly average for this period was of 683 live births.

The graphical method (the chronogram and the polar diagram) and the measurement of the seasonality indices based on the arithmetic average have been used in the statistical analysis of the birth rate seasonality. The conducted measurements have revealed that the average number of live births in December amounted to only 87,5% of the general monthly average, while the number of live births in July amounted, on average, to more than 12,9% than the general monthly average. Based on the seasonality indices, we can say that birth rates have had a seasonal development.

The changes in the demographic behaviour of the population are also made visible by the decline in the average number of children per family. Thus, after 1989, the declining birth rates were attributed to the declining number of live births of all ranks, and especially upper ranks (3rd and more).

The measurement of the changes occurring in demographic behaviours has been conducted by calculating the average rank indicator of the live births. The obtained results reveal a gradual decline of the average rank of live births during 1990-2011, from values of over 2,5 to values approaching 2. However, we can state that families with two or three children are more common in Suceava county.

A similar measurement conducted for Romania on the data recorded in 2011 has led to a 1,86 average rank of live births, actually confirming the national orientation of the population towards a more compact family model with one or two children.

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Annex no.1 Calculations necessary to determine the coefficient of birth seasonal concentration in Suceava

LUNA		ANII					
		2007	2008	2009	2010	2011	2012
Ianuarie	g_i	0,088777	0,08347	0,081951	0,084489	0,087354	0,082183
	g_i^2	0,007881	0,006967	0,006716	0,007138	0,007631	0,006754
Februarie	g_i	0,080236	0,077391	0,070452	0,073866	0,074149	0,076078
	g_i^2	0,006438	0,005989	0,004963	0,005456	0,005498	0,005788
Martie	g_i	0,07771	0,078092	0,083767	0,08399	0,080752	0,084259
	g_i^2	0,006039	0,006098	0,007017	0,007054	0,006521	0,0071
Aprilie	g_i	0,07783	0,077274	0,077957	0,08049	0,077958	0,08023
	g_i^2	0,006057	0,005971	0,006077	0,006479	0,006078	0,006437
Mai	g_i	0,085288	0,082301	0,08643	0,088864	0,079736	0,089632
	g_i^2	0,007274	0,006773	0,00747	0,007897	0,006358	0,008034
Iunie	g_i	0,085408	0,08382	0,09442	0,085864	0,087608	0,087801
	g_i^2	0,007295	0,007026	0,008915	0,007373	0,007675	0,007709
Iulie	g_i	0,091784	0,099603	0,096598	0,087739	0,098781	0,089999
	g_i^2	0,008424	0,009921	0,009331	0,007698	0,009758	0,0081
August	g_i	0,088175	0,087444	0,085704	0,085864	0,093195	0,085847
	g_i^2	0,007775	0,007647	0,007345	0,007373	0,008685	0,00737
Septembrie	g_i	0,092145	0,091069	0,090667	0,093238	0,090909	0,095738
	g_i^2	0,008491	0,008293	0,008221	0,008693	0,008264	0,009166
Octombrie	g_i	0,084566	0,088497	0,086067	0,086239	0,080244	0,08316
	g_i^2	0,007151	0,007832	0,007408	0,007437	0,006439	0,006916
Noiembrie	g_i	0,073138	0,076923	0,07372	0,076365	0,077831	0,073513
	g_i^2	0,005349	0,005917	0,005435	0,005832	0,006058	0,005404
Decembrie	g_i	0,074943	0,074117	0,072267	0,072991	0,071483	0,071559
	g_i^2	0,005616	0,005493	0,005223	0,005328	0,00511	0,005121
$\sum g_i$		1	1	1	1	1	1
$\sum g_i^2$		0,083791	0,083928	0,08412	0,083758	0,084074	0,083897